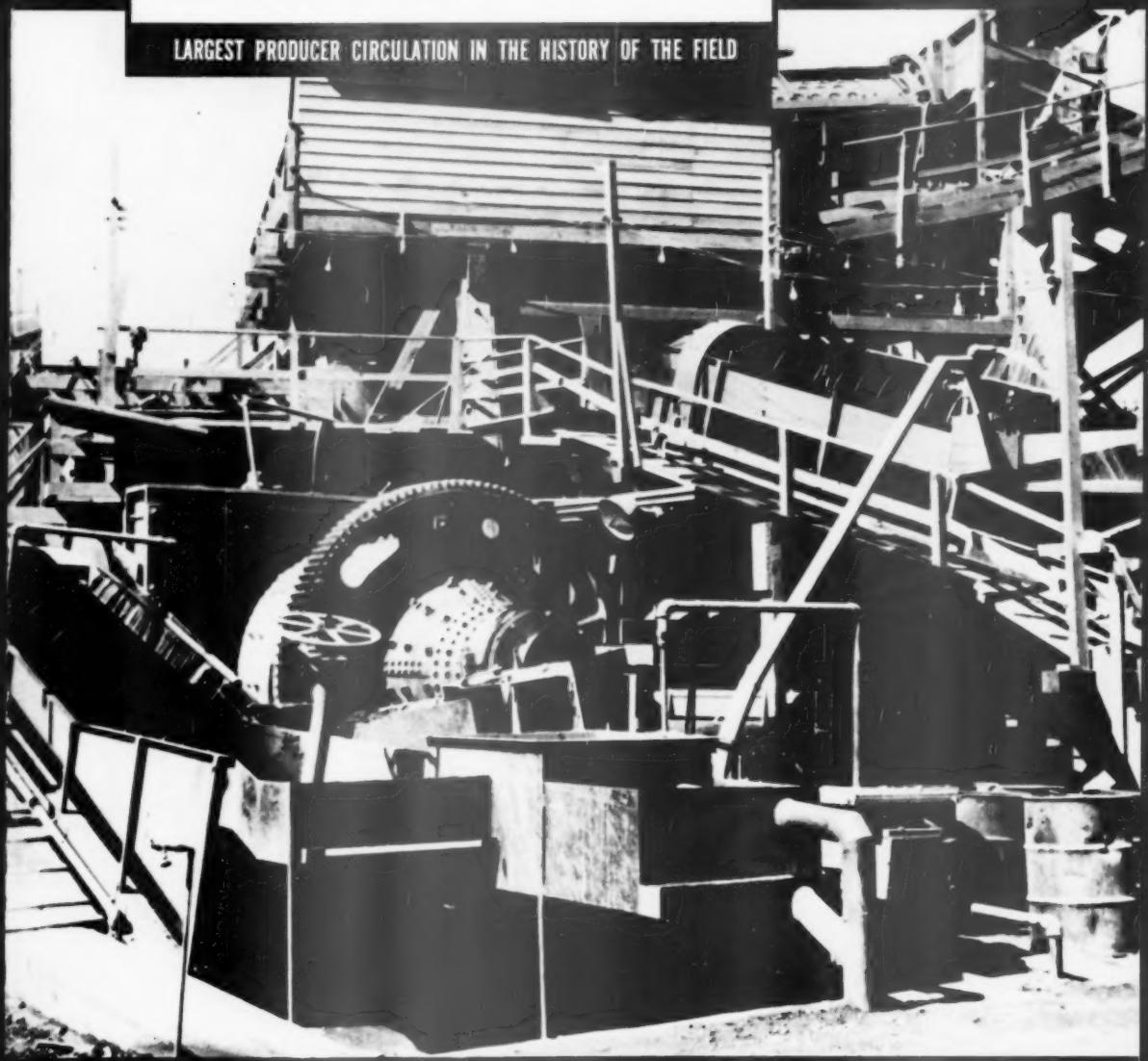


THE INDUSTRY'S RECOGNIZED AUTHORITY

ROCK PRODUCTS

LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD



at Duron® Bars.

No Twist- No Stress- No Strain *with* Mack Six-Wheelers



That's because only Mack six-wheelers have the advantage of Mack's famed Balanced Bogie. Here's an outstanding development that means unmatched flexibility . . . mastery of the toughest terrain without stress or strain.

The exceptional flexibility of the Mack Balanced Bogie insures equal traction, even tire loading and uniform braking on all four wheels.

Exclusive Mack Power Divider assures traction at all times, regardless of terrain.

Simplicity and rugged strength are typified in the functional construction of the Balanced Bogie. Maintenance requirements are reduced to a minimum. Outside of the brake system only four points on the assembly require lubrication.

No place in the suspension ever needs adjustment.

For detailed information on how this and other Mack features can cut costs and increase profits on your particular job, see your nearest Mack branch or dealer.

IT'S PART OF THE LANGUAGE

Built Like a

Mack

Truck



Mack Trucks, Inc., Empire State Bldg., New York 1, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.



First step toward an automobile

A typical example of B.F. Goodrich product improvement

THAT picture, taken 1200 feet underground, shows iron ore that in a few weeks will become a steel automobile body. The moving belt collects the iron ore (often in chunks too big for any man to lift) and carries it up and out — cheaper, faster than the old car-and-locomotive method.

But the belts take a terrific beating — iron ore is not only heavy but lumps also have sharp, cutting edges. Repairs to belts that far underground would be costly, almost impossible. The mine superintendent who decided on this

belt chose B.F. Goodrich because of this company's long history of making belts for "impossible" jobs.

BFG engineers developed a belt to meet these harsh conditions, with extra thick, cushioning cover. It has already been running a year with no slightest sign of wear. Miners and owners both prefer it over old methods, and cost of mining is the lowest that mine ever knew.

Reducing costs for business is our business. B.F. Goodrich improvements in products have resulted in V belts

which outlast previous belts 2 and even 3 times, rubber linings which reduce the cost of handling acid and at the same time protect workers from injury, hose which reduces cost of drilling oil wells because it lasts so much longer — and hundreds of other product improvements which have benefited every industry. For latest cost-saving ideas in rubber, call your B.F. Goodrich distributor or write *The B.F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

B.F. Goodrich
RUBBER FOR INDUSTRY



OCTOBER, 1949

ROCK PRODUCTS

THE INDUSTRY'S RECOGNIZED AUTHORITY



VOL. 52, No. 10

Bor Nordberg
Editor

Nathan C. Rockwood
Editorial Consultant

This Month

We Hear

Editorial — Car-Cleaning Costs Reflect Substantially in Freight Rates

59

67

Rocky's Notes — Case Against Labor Union Monopolies

69

Labor Relations Trends

71

The Personal Side of the News

73

Industry News

77

Hints and Helps

80

New Machinery

82

Plant Designed Exclusively For Agstone Production

W. R. Cliffe

86

Processing "Sub-Grade" Aggregates For Dorena Dam

Deficiency in sand sizes necessitates grinding mill to produce fines. Aggregate characterized by flinty chert, chalcedony and slates of various hardnesses

Walter B. Lenhart

88

Feldspar For Glass Manufacture

Pit-run feldspar is washed at new plant of Appalachian Minerals Co. Magnetic separators effective in reducing iron content

Walter B. Lenhart

94

Producing Metallurgical Lime

Sheffield Steel Corp. produces lime at site of steel plant. New shaft kilns employ side and center burners with natural gas

Gordon R. Lacy

97

Blending to Meet Specifications

Eagle City Sand & Gravel Co. builds stationary operation around unitized portable crushing plant

99

Fineness of Portland Cement

Different methods of fineness analyses considered for seven cements investigated. Complete sedimentation analyses essential

Dr. A. R. Steinherz

100

Established Stone Producer Adds Portable Plant

104

Readers Discuss Articles on Cement, Concrete and Aggregates

Nathan C. Rockwood

106

Perlite Producers Hold Convention

109

Cement Industry in Germany

Cement manufacturers have been through trying times. Coal and power supply are the chief operating obstacles today

Dr. Alfred E. Beilich

114

Pennsylvania Agstone Producers Meet

116

Concrete for Dorena Dam

Plant produces up to 1000 cu. yd. of air-entrained concrete per day. Batching cycle is completely automatic

Walter B. Lenhart

147

Concrete Products Operation Designed in Straight Line

One self-powered traveling mixer serves a block machine, a brick machine and two specialty units at Dunbrin Co.

150

Diversify To Expand Concrete Masonry Production

Pumice Building Materials, Inc., produces two-core modular block; develops large radius bullnose unit; pumice stone veneer for commercial buildings and pilaster block of original design

152

Lightweight Aggregate From Expanded Slag

Lone Star Steel Co. uses rotor-type expansion machine with water-cooled side plates, table and cone

154

Filler Block Floor System

156

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ROCK PRODUCTS is published monthly by MACLEAN-HUNTER Publishing Corporation, 309 West Jackson Blvd., Chicago 6, Illinois; Horace T. Hunter, President; E. R. Gaulier, Vice President; J. L. Frazier, Secretary. Copyright, 1949. Entered as second-class matter, Jan. 30, 1936, at the Chicago, Ill. post office under the act of Mar. 3, 1879. Additional entry at Milwaukee, Wis. **ROCK PRODUCTS** is indexed regularly by Engineering Index, Inc.

SUBSCRIPTION INFORMATION

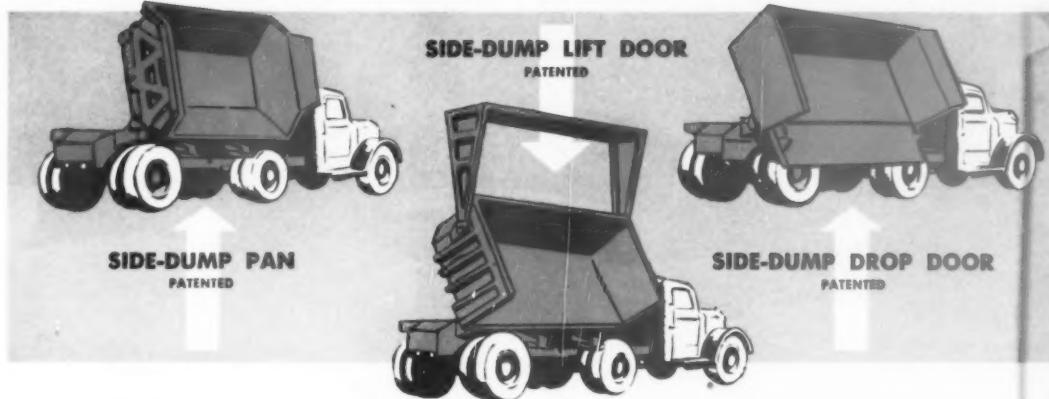
Subscription Price: United States and Possessions, Canada one year, \$2.00; two years, \$3.00; three years, \$4.00. Pan American, one year, \$4.00; two years, \$7.00; three years, \$10.00. All other foreign, one year, \$6.00; two years, \$12.00; three years, \$18.00. Twenty-five cents for single copies. Indexed monthly in *Engineering Index*.

Canadian subscriptions and remittances may be sent in Canadian funds to **ROCK PRODUCTS**, P. O. Box 100, Terminal "A," Toronto, Canada.

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for low-cost hauling of earth, rock and ore**

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You're ready for anything when you put this Timken rock drilling team to work.

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Profits begin in the *Key Machine* spots. You can't afford anything but the best at the heart of the job. Plan ahead now to have a Northwest Rock Shovel.

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Chicago 3, Illinois

- Simplicity of design for easy maintenance.
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 - Cushion Clutch reduces shock overloads on parts under power.
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 - All High-Speed Shafts on Ball or Roller Bearings assure minimum loss to friction.
- These and other Northwest advantages assure higher output and greater dependability in the *Key Spots*.



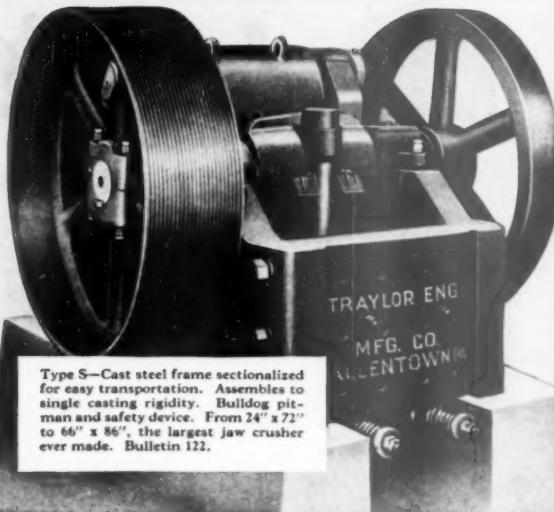
NORTHWEST

Convertible for any Mining Material Handling or Excavation Problem



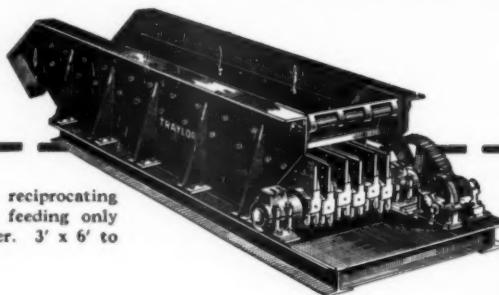


Types H & HB—Sturdy all-welded, steel plate frames in sizes from 8" x 12" to 56" x 72". Larger sizes have rod type Bulldog pitmans and safety devices. Bulletin J105.

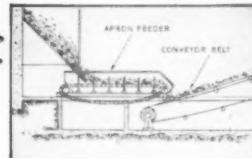


Type S—Cast steel frame sectionized for easy transportation. Assembles to single casting rigidity. Bulldog pitman and safety device. From 24" x 72" to 66" x 86", the largest jaw crusher ever made. Bulletin 122.

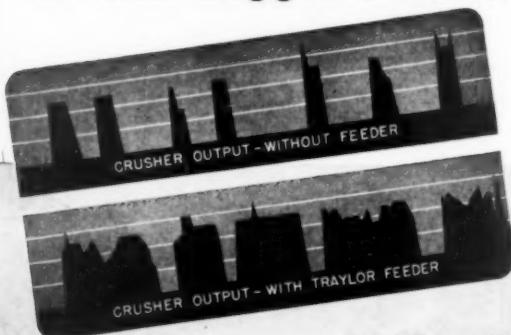
TRAYLOR TEAMS SET



Grizzly Feeder—Spaced, reciprocating bars remove fines while feeding only coarse material to crusher. 3' x 6' to 10' x 20'. Bulletin 114.



**Star Performers
Team Up
to Win Bigger Profits**



The unsurpassed production from Traylor Jaw Crushers reaches its peak when material is supplied to them in controlled quantities with Traylor Feeders. The performance chart below demonstrates the ability of Traylor Feeders to maintain maximum crusher production with minimum power costs. Traylor Crushers with non-chokable, smooth-faced, curved jaw plates easily keep pace with a full, steady

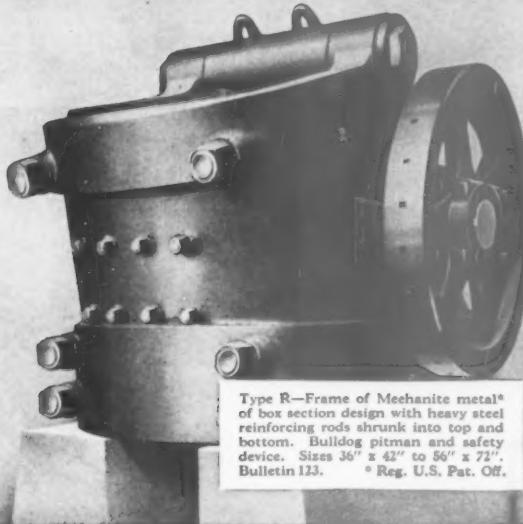
This chart shows clearly why crusher production can be more than doubled when material flow is controlled with a Traylor Feeder.

A "Traylor" Leads to Greater Profits



Type M—Rugged frame of Meehanite metal[®] with three heavy flanges. Sizes from 8" x 12" to 30" x 42". Bulletin 124.

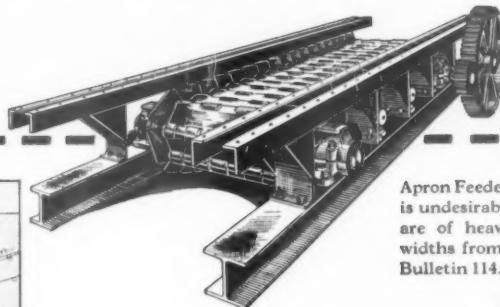
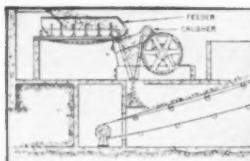
*Reg. U.S. Pat. Off.



Type R—Frame of Meehanite metal[®] of box section design with heavy steel reinforcing rods shrunk into top and bottom. Bulldog pitman and safety device. Sizes 36" x 42" to 56" x 72". Bulletin 123.

*Reg. U.S. Pat. Off.

PRODUCTION RECORDS



Apron Feeder—Use where sifting through is undesirable. Overlapping, steel plates are of heaviest proportions. Built in widths from 30" to 84" and any length. Bulletin 114.



Curved Jaws Crush More With Less Power

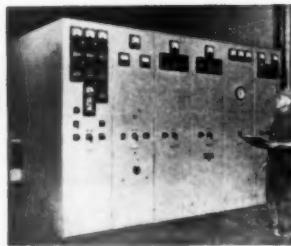
The curves of Traylor Jaw Plates apply more power as direct crushing force . . . eliminate lifting and churning. Non-choking design distributes wear more evenly over entire surface . . . makes them produce more each day and last up to three times as long.

TRAYLOR

Jaw Crushers and Feeders
Reduction and Gyratory Crushers . Kilns
Coolers . Dryers . Grinding Mills



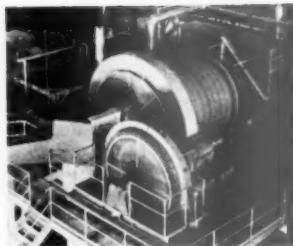
1 In the new plant practically all the electric equipment was supplied and co-ordinated by General Electric. Photo shows (inside circle) the G-E outdoor package substation which steps down incoming power from 69,000 to 4160 volts for distribution to five unit substations located at plant load centers. Complete and ready to install G-E package substations cut installation time and costs, help get production going sooner.



2 The old power system is interconnected with the new purchased power system by means of this 2400-volt, 5000-kva G-E Metal-Clad switchgear. Containing adequate interrupting capacity for short circuit protection, these G-E units are completely metal-enclosed for personnel safety.



3 Here is one of several G-E control stations, at which all related processes of a given department are closely co-ordinated by one operator. Combining indicating instruments and signal lights with pushbutton stations and selector switches, they permit efficient use of manpower.



4 Driving this primary wet ball mill (capacity 235 barrels per hour) is a 500-hp, 4160-volt G-E synchronous motor. Meeting the highest standards of performance, G-E synchronous motors are extensively used for maintaining exact speeds and for improving power factor in many cement plants.

You can put your confidence in—

GENERAL ELECTRIC 

CO-ORDINATED ELECTRICAL SYSTEM PAYS OFF!

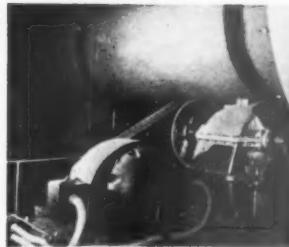
Ideal's new Portland cement plant uses General Electric co-ordinated drives throughout—from primary crushers to packing conveyors—for operating economy.

At the end of their new plant's first year of successful operation, the management of Ideal Cement Company at Portland, Colorado, is well pleased with their General Electric "packaged" electrical system.

Practically all the components in this system were supplied by General Electric, a company which manufactures *all* the electrical components you require.

G-E application engineers familiar with the problems of the cement industry, and assisted by specialists in particular product lines, carefully selected, co-ordinated, and installed the components as a system—complete and ready to go!

Whether you plan a complete new plant, or the modernization of an existing one, you'll save time and money by consulting your G-E representative first. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*



5 This 125-hp, 440-volt G-E motor drives one of the plant's two rotary kilns, each 400 feet long. Built to require minimum maintenance, these motors are not affected by the heat of the kiln. Other G-E induction motors in this plant operate conveyors, pumps, fans and crushers.



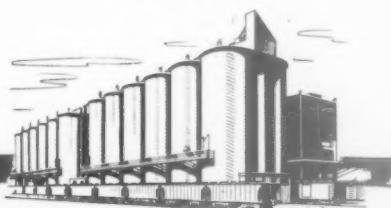
6 Controlling a number of 440-volt G-E motors in the new crushing plant is the G-E Cabinetrol® shown. Compact and factory-assembled, it provides conveniently centralized low-voltage motor controls. Its rigid steel enclosure promotes personnel safety, minimizes disturbances due to dust.

*Reg. U. S. Pat. Off.



7 This G-E Limitamp control lineup contains starters for 4 G-E 4160-volt synchronous motors, two rated at 1000 hp, two at 500 hp. Combining high-voltage motor control with built-in short-circuit protection, these controllers will protect their connected drive up to 1-million kva fault level.

**Everything you need
to cut rock product costs
... electrically!**



FIELD PROVED

Unique 9 Part Fabric

Its patented construction is entirely unlike any other. Scores of wires are stranded in 9 parts, then into three parts.

Interlaced By Machine

On special precision machines, originated by Union Wire Rope engineers, three three-strand parts are so interlaced as to form a sling fabric so much stronger, with so much tougher wearing qualities and with so much more flexibility that you just have to see how much longer service it gives to believe it.

Constructed To Prevent Rotating of Load

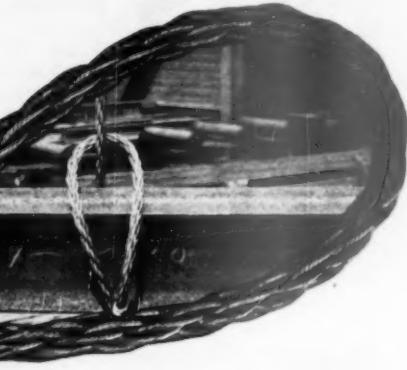
The inequalities of hand made slings are eliminated. The parts of Tuffy Sling fabric are so uniquely interlaced that they neutralize the load torque which causes rotating of the load on straight pulls.

PATENT NO. 2,454,417

6000
UNION WIRE ROPE

Tested Strength Is Twice Safe Working Load Limits

Metal tags on Tuffy Slings give their safe working load. Each sling or leg of a bridal sling is proof-tested to twice this safe working load.



95% of Fabric Strength Is Developed In the Eye Splices

Here the unique interlacing of Tuffy scores again. It permits ready forming of eye splices possessing 95% of the strength of the sling fabric.



unio
Wire Ro

**Super
TOUGH**



**Ultra
FLEXIBLE**

REG. TRADE MARK



Tuffy Slings



Working any sling under load with knots or kinks in it is not recommended. But, sometimes it's unavoidable. Then is when the ultra-flexibility of Tuffy Slings stand you in good stead. Tuffy can take more of such punishment longer and you can straighten them out more often without material damage. The same is true of flattened eyes and because of the unique interlaced fabric construction, cutting of any one of the 9 strands will not result in stranding of the sling.

For a long time now, Tuffy Slings have proved they have the extra strength and ultra-flexibility to stand up during longer service on any kind of a load, under any kind of pull and with every type of hitch.

Try any one of the 9 factory packaged sizes. Prove their money-in-your-pocket worth to you to your own satisfaction.

Tuffy Sling Fabric also Available for Eye Splicing in Your Own Rigging Loft

If you are rigged for eye splicing your own slings, Tuffy Sling fabric is available on the reel. Your riggers will like the ease and speed of splicing that Tuffy interlaced construction affords.

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KANSAS CITY 3, MO.

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of 9 Sizes Which You Deliver
as Complete Packages.

For Tuffy Slings—See Your
Union Wire Rope Distributor
(Listed in Yellow Section
of Your Telephone Directory) and/or Send
This Coupon.

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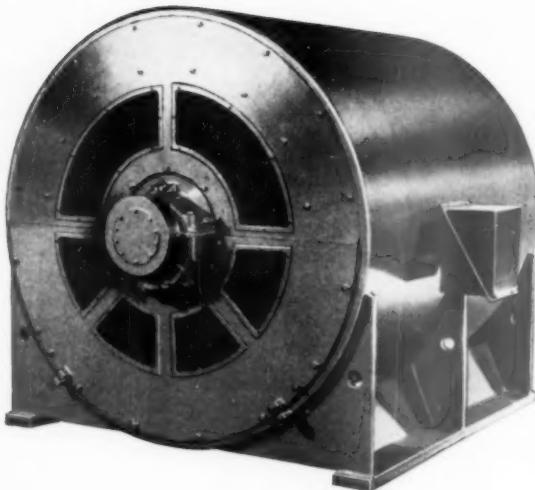
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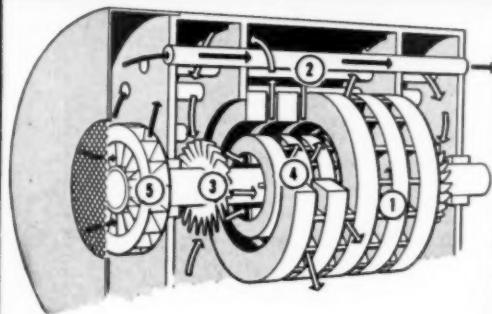
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**TUBE-TYPE
TOTALLY-ENCLOSED
FAN-COOLED
MOTORS!**



INSTALL INDOORS or OUT!

How Tube Cooling Works



Stator core (1) is surrounded by tubes (2). Internal fans (3) circulate air through ducts (4) in rotor and stator and around tubes, transferring heat to tubes.

External fan (5) drives outside air through tubes, removing heat and keeping tubes clean. All electrical parts are enclosed. Dirt cannot enter.

- Dirt-proof and corrosion-resistant
- Heat exchanger is practically self-cleaning
- Simple self-contained cooling system—sizes from 75 to several thousand horsepower

WHEREVER DUST, DIRT, fly ash, rain and snow, smoke, or corroding fumes keep motor maintenance costs high, this Allis-Chalmers tube-type motor will cut maintenance sharply.

All electrical parts—including stator core—are enclosed. Simple heat transfer system keeps temperatures well within rated limits. Cleaning is rarely needed because air passages are unrestricted. Air flow through the straight tubes removes foreign matter.

Important savings have been proved in three years of field operation. Sizes from 75 hp and up. Also explosion-proof designs. For complete information, outline your requirements to your A-C Sales Office, or write for Bulletins 05B7150 and 51R7149.

ALLIS-CHALMERS, 975A SO. 70 ST.
MILWAUKEE, WIS.

A-2610

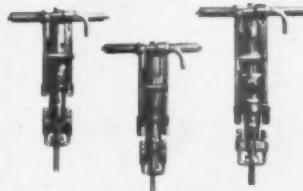
ALLIS-CHALMERS





No matter where you send a Gardner-Denver Portable Compressor, you can be sure of a steady, uninterrupted air supply. For regardless of climate or altitude, the complete water jacketing of all cylinders "weather-conditions" them against over-heating—and from cold, unlubricated starts in sub-zero weather. For complete information, write Gardner-Denver Company.

... FOR THE RIGHT AIR TOOLS



There's a Gardner-Denver Sinker that's "correct" in size and power for every type of ground. Shown here are the three most popular models: the high-speed S45 for secondary drilling or medium rock—the S55, most popular 55-pound sinker on the market—the S73, 67 pounds of speed and power for deep holes or the hardest formations.



Powerful Gardner-Denver B87 Paving Breaker has exclusive throttle safety latch—can be easily moved around the job without shutting off the air. Easily converted to a sheeting driver.



The feed of the new Gardner-Denver URM99 Wagon Drill is powered by a five-cylinder radial air motor. Designed for speedy, six-foot steel changes; carries a 3½ in. or 4 in. bore derrick drill. Your operator will like the ease of control.

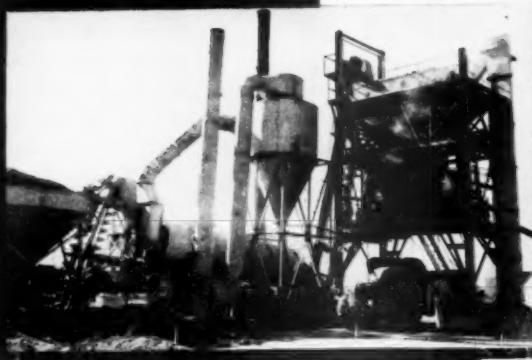
The Gardner-Denver T23 Backfill Tamper is balanced for easy "walking" over the fill—has valve and exhaust that won't "freeze" in cold, damp weather—contains integral oil reservoir that assures complete lubrication.



Gardner-Denver Model 28 Clay Digger makes digging easy in clay or hardpan—can also be equipped with axe blade for trimming or cutting timber, or with mail point or chisel for light demolition work.

GARDNER-DENVER SINCE 1859

GARDNER-DENVER COMPANY, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada) Ltd., Toronto, Ontario



Cedarapids

Built by
IOWA

OLD RIDGE ROAD— “She ain’t what she used to be...”

She’s a *better* road today, and built at lower cost . . . because modern aggregate producing and bituminous mixing equipment is **QUALITY-BUILT** to meet today’s rigid specifications with more tons per hour at lower cost per ton. And in quality construction, Cedarapids leads the field! Cedarapids quality means consistent high-volume output . . . machines that slug away day after day, with less downtime for repairs and maintenance . . . giving you the steady “grind” that keeps other equipment on the job at full efficiency. Cedarapids quality means lower labor costs . . . faster, easier operation . . . more net profit in your pocket. On all your aggregate producing or bituminous mixing jobs, insist on Cedarapids quality . . . be sure to **BUY THE BEST—BUY CEDARAPIDS.**

THE IOWA LINE of Material Handling Equipment Includes:

ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS • STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
UNITIZED ROCK AND
GRAVEL PLANTS
FEEDERS • TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE AND GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE AND VOLUMETRIC TYPE
ASPHALT PLANTS
HAMMERMILLS
DRAG SCRAPER TANKS
WASHING PLANTS
SOIL COMPACTION UNITS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

*Choose
Your Mill
from*

the RAYMOND

FINE GRINDING plus FLASH DRYING

equals a BETTER PRODUCT at LOWER COST

IN THE NON-METALLICS FIELD, Raymond pulverizing and separating equipment with flash drying system offers outstanding advantages for simplifying your processes, improving product quality and reducing costs of operation.

LIMESTONE



GYPSUM



BAUXITE



CLAY AND
KAOLIN



PHOSPHATE
ROCK



BARYTES



TALC

These
are typical of materials efficiently handled with Raymond flash drying equipped mills.

There is a complete line of mills to select from, available in many different types and sizes to meet any production problem. Every installation is specially worked out to provide the proper type of Raymond mill, engineered and equipped to suit your job requirements.

IF YOUR PRODUCT is one of the many non-metallic minerals, processed directly from the mine or quarry, it may contain anywhere from 3% to 5% moisture, and be too wet to pulverize in an ordinary mill. Here the Raymond method can be applied economically.

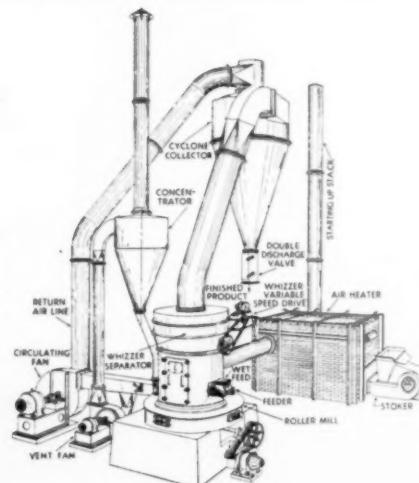
A Raymond flash drying unit does the work of a dryer and pulverizer combined, thus saving the extra step of separate drying.

AS AN EXAMPLE, you can grind limestone to 325-mesh fineness, at the same time reducing the moisture content from around 5% to less than $\frac{1}{4}$ of one per cent . . . producing a fine, dry, free-flowing product of uniform quality. Resultant savings are substantial . . . which accounts for the widespread use of Raymond flash-drying equipped mills.

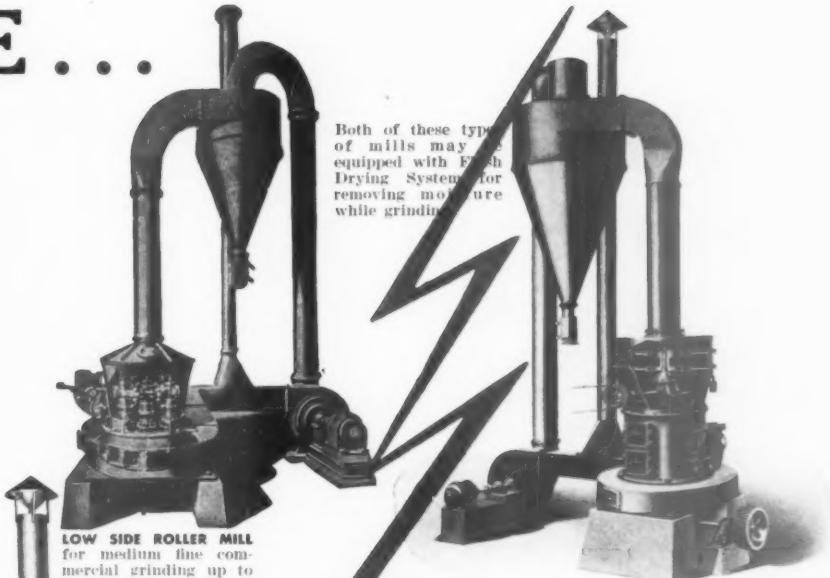
AN ECONOMICAL SET-UP FOR PROCESSING NON-METALLICS

Typical arrangement of equipment for a Raymond High Side Roller Mill with flash drying system for removing moisture and pulverizing in one operation.

Write for information on equipment for handling your pulverizing and drying problems.



LINE . . .



LOW SIDE ROLLER MILL
for medium fine commercial grinding up to about 95% passing 100-mesh.

HIGH SIDE ROLLER MILL
with whizzer separator for extreme fine pulverizing up to 99.99% through 325-mesh.



... for handling various materials such as ...
... or ...
... or powdered products which require drying only.



CAGE MILL with Flash Drying for materials requiring disintegration and drying.



IMP MILL with Flash Drying for removing large percentages of moisture while grinding.

COMBUSTION ENGINEERING—SUPERHEATER, INC.
RAYMOND PULVERIZER DIVISION
1307 North Branch Street Chicago 22, Illinois

HOW BASIC REFRACTORIES GOT Bigger Output — With These Longer Kilns



MAGNEFER, used in open hearth and electric furnaces as "fettling" refractory, is produced by Basic Refractories, Maple Grove, Ohio. Magnefer is made by dead-burning dolomite and iron ore flux to a temperature of approximately 3,000° F. in rotary kilns.

Like thousands of other companies, Basic Refractories was faced with the problem of stepping up production to meet a huge demand for their product.

A low-cost solution was found by making use of two existing short kilns at a great saving in first cost. These kilns were joined together and added-to (with a special section), making a 328 ft unit. The second kiln was then engineered and built by Allis-Chalmers to match the first.

Considerations of length, arrangement and the many other complex factors involved in a rotary kiln installa-

tion were worked out to obtain maximum economy as well as the desired capacity.

Result? Substantially increased production and a lower cost per ton than was possible with the shorter kilns.

CHECK A-C EXPERIENCE, FACILITIES

Whatever your burning process, it will pay you to consult Allis-Chalmers.

- A-C experience covers over 50 years of rotary kiln engineering.
- Hundreds of successful kilns installed.
- Allis-Chalmers shop and manufacturing facilities are unsurpassed.

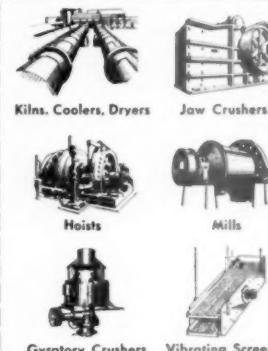
The Allis-Chalmers representative in your area is as close as your phone. Call him today, or write for Rotary Kiln Bulletin 07B6368. Offices or distributors in principal cities in the U.S.A. and throughout the world.

ALLIS-CHALMERS, 975A SO. 70 ST.
MILWAUKEE, WIS.

A-2656

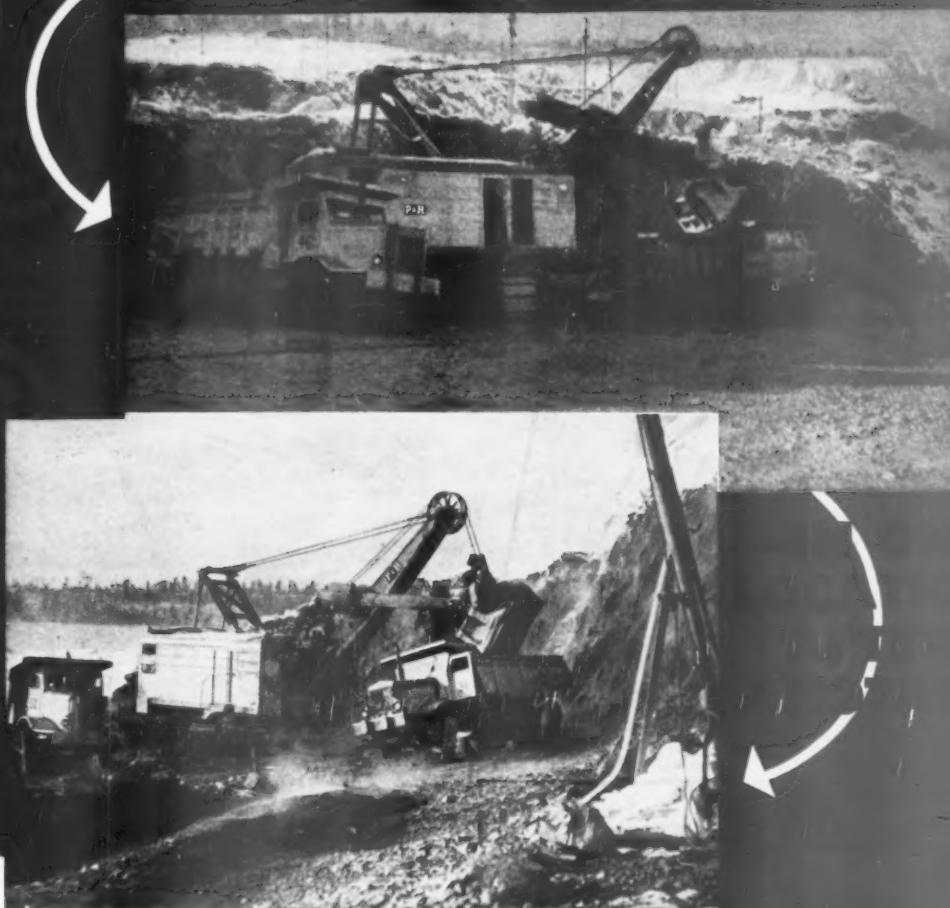


AND OTHER EQUIPMENT
FOR THE CRUSHING, CEMENT
AND MINING INDUSTRIES



ALLIS-CHALMERS

ROCK PRODUCTS. October, 1949



Why are more and more large operators reordering P&H Electric Shovels? The reason is clear — lower operating costs. They've piled up the proof with Added Values like these:

1. **"Magnetorque" *Drive**—hoists the dipper with electro-magnetic power — lowers with less than half the usual inertia to overcome. It's faster.
2. **"Magnetron" Control**—entirely eliminates control fingers and contactors. It's simpler, more dependable.
3. **Independent Propel**—eliminates sliding gears, brakes, clutches and their controls — provides faster move-up.
4. **Air-filtered cab**—pressurized to allow only clean, fresh air to enter — no dust to damage electrical equipment.

Yes, proof on the job makes P&H the choice of discriminating buyers — leads to one repeat order after another. Investigate before you invest.

* T. M. of the
Harnischfeger
Corporation for Electro-
Magnetic Type Clutch

ELECTRIC SHOVELS

4465 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER
CORPORATION

EXCAVATORS • ELECTRIC EXAMS • ARC WELDERS • HOISTS • WELDING ELECTRODES • MOTORS

Every third P&H Electric Shovel sold is a repeat order

LEADING THE FIELD IN ELECTRIC SHOVEL DEVELOPMENT



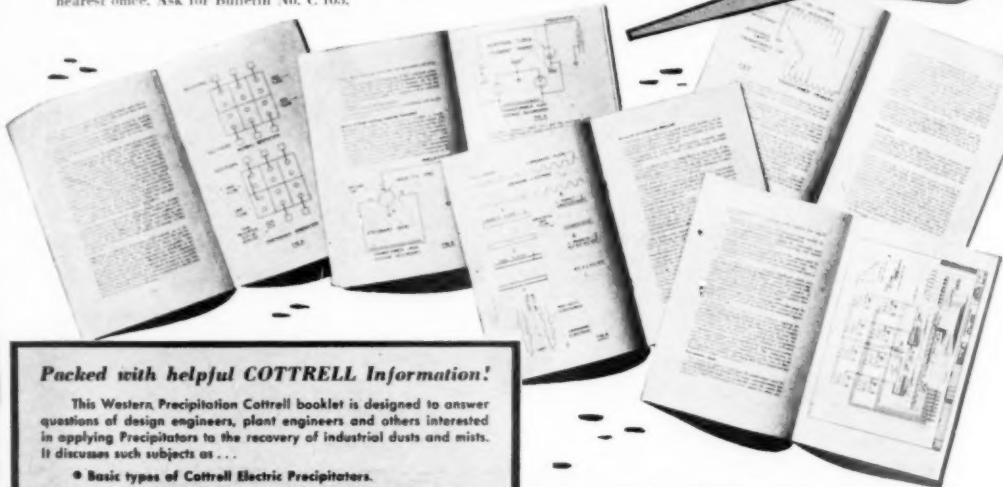
From Western Precipitation—the organization that pioneered the commercial application of Cottrell Precipitation...

IF YOU ARE ENGAGED in any phase of industry where the recovery of dusts, fumes, fly ash, mists, fogs or other suspensions from gases is a problem, you will find this booklet on the COTTRELL Electrical Precipitator helpful and informative.

Western Precipitation pioneered and installed the first commercial application of the well-known COTTRELL Electric Precipitator—Dr. Cottrell, the inventor, being a member of the company. And for more than 42 years Western Precipitation has consistently led in developing new COTTRELL advancements and techniques for recovering suspensions from gases, both wet and dry.

This 28 page booklet summarizes many of the basic facts you should know about modern COTTRELL Precipitators—the various types available, how they operate, principal types of electrode systems and rectifiers, shell constructions, etc. As long as the supply lasts, a free copy will be sent you on request to our nearest office. Ask for Bulletin No. C 103.

28 PAGES
of helpful facts to
know about
COTTRELL
ELECTRICAL
PRECIPITATORS



Packed with helpful COTTRELL Information!

This Western Precipitation Cottrell booklet is designed to answer questions of design engineers, plant engineers and others interested in applying Precipitators to the recovery of industrial dusts and mists. It discusses such subjects as . . .

- Basic types of Cottrell Electric Precipitators.
- Principal parts of a Cottrell Precipitator.
- Mechanical and Electronic Rectifiers.
- Various types of Collecting Electrodes (rod curtains, corrugated plates, dual plates, pocket electrodes, etc.).
- Removal of Collected Material.
- Factors in Shell Construction (steel, concrete, brick, etc.).
- Operating Efficiencies and the Effect of Various Factors on Performance.

. . . and many other basic Cottrell facts. Write for your free copy of Bulletin C103 today while supplies are adequate!

Western Precipitation is not affiliated with any other company in the field of electrical precipitation except its wholly owned subsidiaries, International Precipitation Corporation and the Precipitation Company of Canada, Ltd. Whether you are now contemplating the installation of a Cottrell Electrical Precipitator, or may be interested in such an installation at a future date, we can and will serve you in any part of the United States or other countries.

NOW SELLING . . .

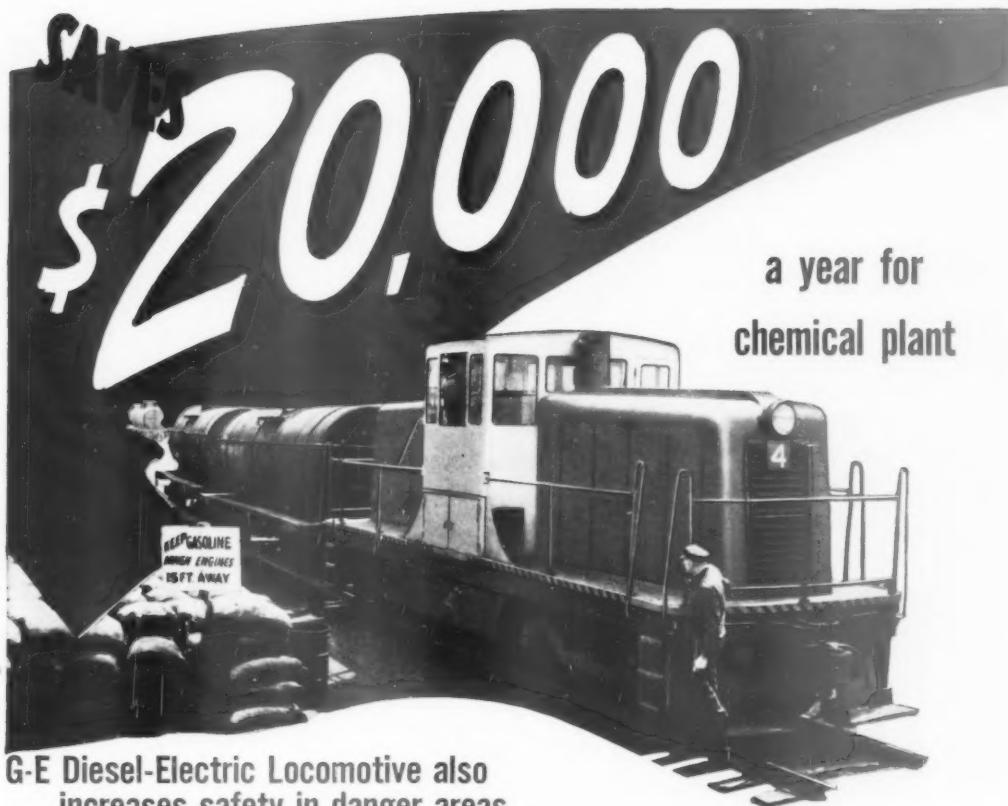
COTTRELL
Precipitators
MULTICLONE
Collectors
TURBULAIRE
Spray Dryers

...in all parts of the U.S.A. and foreign countries.

**WESTERN
Precipitation
CORPORATION**

ENGINEERS DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR
COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1006 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
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PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL



G-E Diesel-Electric Locomotive also increases safety in danger areas

Slashes switching costs \$1700 a month! Ready for work 95% of the time.¹ Gives maximum safety in inflammable areas! The Calco Chemical Division of American Cyanamid knows that it made a wise investment by purchasing a 65-ton G-E diesel-electric locomotive to replace steam operation.

ANNUAL RETURN—47%

Delivered May, 1946, this 65-tonner is one of two G-E built locomotives used for transfer work and intra-plant switching at Bound Brook, N. J. The purchase price was paid back in less than 2½ years. Hourly fuel costs were cut 84%. Derailments, more than one a week with the steamers, were eliminated. Maintenance expenses were sharply decreased; and time

out for maintenance and inspection now averages just 5% of the 16 hour working day.

HOW YOU CAN BENEFIT

This performance is typical of G-E locomotives in industry. Your plant will reduce switching time up to 50%—will switch cars dependably and economically—will maintain the safest, cleanest working conditions possible—if you switch with G-E dieselelectrics.

The savings in your plant can be accurately estimated in advance. Your G-E representative will help you determine your needs. Call or write him today.

Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

GET THE FACTS ON LOW-COST SWITCHING!

- Operating Results
- Graphs
- Tables

GENERAL ELECTRIC



Section AQ-4909
General Electric Company
Schenectady 5, N. Y.

Without obligation send me your fact-filled locomotive bulletin "Switch to Diesel-electrics and Save," GEA-4909.

Name _____

Company _____

City _____ State _____

Among Leading Aggregate Producers

REPEAT ORDERS

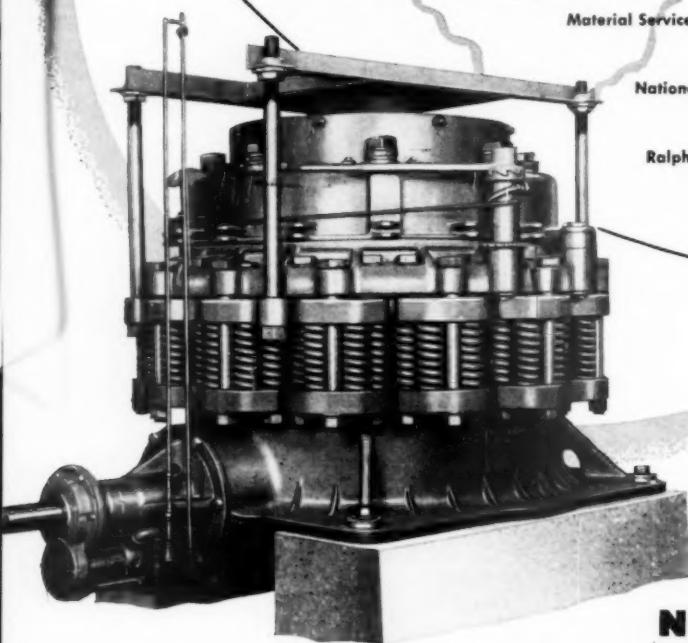
prove the outstanding performance of
SYMONS CONE CRUSHERS

Azusa Rock and Sand Co.
Asbestos Corp., Ltd.
American Aggregates Corp.
American Materials Corp.
Birmingham Slag Co.
Buffalo Slag Company
Basic Refractories Inc.
Consolidated Rock Products Co.
Canada Crushed Stone Co., Ltd.
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Commonwealth Quarry Co.
H. G. Fenton Materials Co.
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Consumers Company
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France Stone Company
General Crushed Stone Co.
Kentucky Stone Co.
Material Service Co.
National Lime and Stone Co.
New York Trap Rock Co.
Pacific Coast Aggregates, Inc.
Ralph Rogers & Co.
Thornton Quarries Corp.
Woodstock Slag Corp.

Henry J. Kaiser Co.
Kelleys Island Lime & Transport Co.
New Haven Trap Rock Co.

Symons Cone Crushers are available in three types—Standard, Short Head and Intermediate—in a wide range of sizes to fit your requirements. In addition, Nordberg manufactures primary gyratory and jaw crushers, vibrating screens, grinding mills, grizzlies, feeders, kilns, coolers, dryers and a complete line of diesel engines for all power requirements.



C949

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NORDBERG

Machinery for processing
ores and
industrial minerals



Gyratory and
Jaw Crushers



Symons Cone
Crushers



Vibrating Screens
and Grizzlies



Grinding
Mills



Diesel
Engines

Your Union Multiwall Specialist

knows how to make your package do a selling job



UNION package designers can transform the fine printing surface of a Multiwall Bag into a compelling advertisement for your product at the point of sale—where advertising really pays off! Your brand name and trademark, exclusive features, formulations and instructions for use—all can be presented with color and drama to help your product sell.

That Union package designing *really sells* has been proved year after year in the sales records of

many companies—and repeatedly proved in national packaging competition.

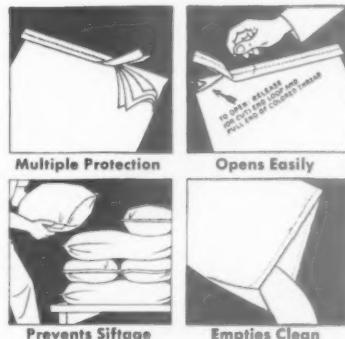
This packaging experience is yours to command, through your Union Multiwall representative. Use it!

* * *

SPECIAL NOTE TO USERS OF OTHER TYPES OF PACKAGING

Companies making over 300 different products have cut packaging and handling costs by switching to Union Multiwall Bags.

When your Union Multiwall representative calls let him analyze your entire packaging problem to see what savings you can effect!



UNION Multiwall Bags

UNION BAG & PAPER CORPORATION

233 BROADWAY, NEW YORK 7, NEW YORK

Offices in: CHICAGO, ILL. • NEW ORLEANS, LA. • MINNEAPOLIS, MINN. • KANSAS CITY, MO. • HOUSTON, TEXAS

**In Two Minutes You Can See
Exactly How...**

The Concave Side—

(U.S. Patent No. 1813698)

SAVES Your Transmission DOLLARS

Take *any* V-belt in your hands and bend it as it bends in going around a pulley. You will see that the top of the belt, being under *tension*, grows *narrower*. The body, under *compression*, *widens*. The sides *bulge out*.

This shape change—in a *straight-sided* V-belt—is shown in Figures 1 and 1-A, below.



Straight-Sided V-Belt



How Straight-Sided V-Belt
Bulges in Sheave-Groove.

Now look at Figures 2 and 2-A. There you see how the *same shape change* affects the V-belt built with the precisely engineered *Concave Side* (U.S. Patent No. 1813698).



Gates Vulco Rope
with Concave Side.



No Side Bulge.
Precise Fit in Sheave Groove.

The top of the belt narrows, the body widens. But the sides *merely straighten*—and the new shape *exactly fits* the sheave groove!

Two savings result. (1) Uniform side-wall wear—longer life! (2) Full side-wall grip on the pulley carries heavier loads and sudden load increases without slipping; saves belts, saves power!

You can actually feel
the sides of a belt change shape
as the belt bends.



The Mark of SPECIALIZED Research

**The Concave Side is
MORE IMPORTANT NOW Than Ever Before**

Because the sides of a V-Belt are what actually drive the pulley, it is clear that any increased load on the belt means a heavier load that must be transmitted to the pulley directly through the belt's sidewalls.

Now that Gates SPECIALIZED Research has made available to you SUPER Vulco Ropes—carrying fully 40% higher horsepower ratings—the life-prolonging Concave Side is naturally more important in conserving belt life today than ever before.

GATES VULCO ROPE DRIVES
IN ALL INDUSTRIAL CENTERS

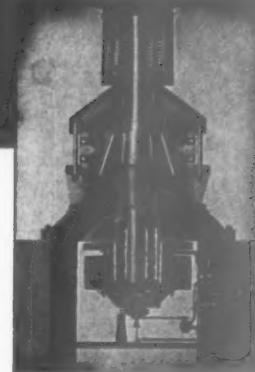
Engineering Offices
and Jobber Stocks

THE GATES RUBBER COMPANY
DENVER, U.S.A.

The World's Largest Makers of V-Belts

KVS

AND



THIS 5½' x 8' KENNEDY AIR SWEPT TUBE MILL PRODUCES 7 TONS

PER HOUR — With a feed of $\frac{1}{4} \times \frac{3}{4}$ in. limestone and dust

Use the Kennedy Air Swept Tube Mill to get superfine grinding at bottom cost. The product ground in this tube mill and collected in three cyclones is (1) 5 tons per hr. of 80% thru 200 mesh, (2) 1 ton per hr. of 92% thru 200 mesh, and (3) 400 lbs. per hr. of 99.8% thru 325 mesh. Simple adjustment permits a desired variation from this combination of fine mesh sizes. The mill is driven through the remarkable Kennedy Integral Gear Drive for Tube Mills. This enables the motor to be direct-connected to the high speed shaft. The gears cannot be misaligned or set wrong. Power required to drive the mill is thus greatly reduced.

KENNEDY ROLLER BEARING GEARLESS CRUSHER . . .

With a Synchronous Motor built in its pulley, this machine shows 80% saving in the cost of maintenance and a saving of 50% in power over geared crushers. It has produced 156 tons per hour when set to $7\frac{1}{16}$ " between the head and concaves at the bottom. The motor runs on roller bearings and is continuously lubricated by a force feed lubrication system. The motor is built especially for this crusher.

It is now possible to combine the operating product of a rotary kiln with the operating economy of a vertical kiln with the Kennedy Stone Preheater and Deheater. By partial calcining the material this system reduces kiln wear and kiln breakdown. It also reduces heat loss in exit gases and has proved so efficient in actual operation that 40% fuel savings and increased output exceeding 20% have been obtained.

Short kilns employing the Kennedy method also require an internal glaze which lessens the wear on kiln liners, lowers the power requirements, and reduces formation of kiln rings. Overburned and underburned lime is practically eliminated. Coal feed and lime calcination are switchboard controlled.

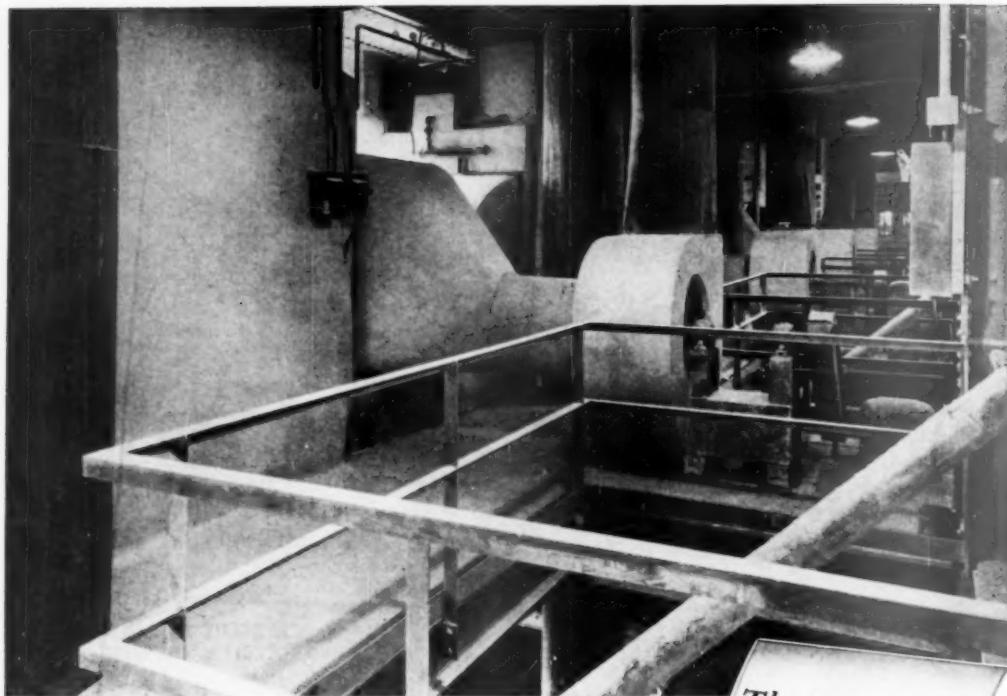


20% Increase in Capacity — 40% Savings in Fuel

The latest in scientific lime production KENNEDY STONE PREHEATER - ROTARY KILN DEHEATER and SOAKING PIT

Kennedy-Van Saun Manufacturing and Engineering Corp.

2 Park Avenue, New York 16, N. Y.



KOPPERS-ELEX PRECIPITATOR RECOVERS MORE GYPSUM THAN GUARANTEED!

*The Story Behind
KOPPERS-ELEX
Performance
GUARANTEE*

A LARGE gypsum plant, faced with the problem of controlling the disadvantage of gypsum dust, chose a Koppers-Elex Precipitator. Outstanding performance in excess of guaranteed results was obtained.

Under standard (A.S.M.E.) tests conducted during actual operating conditions, the precipitators on four calcining kettles limited re-

siduals to .07 grain per cubic foot of gas—and the overall efficiency on the precipitators installed on the rock drier averaged 99.30%.

This performance, which exceeds the guarantee, is typical of Koppers-Elex operation. Correct design and precision engineering, coupled with the experience gained from over 1000 successful installations, give superior results in the

recovery or removal of materials from gases. For the same superior performance in your plant, specify Koppers-Elex — designed, engineered, built, installed and guaranteed by Koppers...with 111 years of reputation-building integrity behind it. Koppers Co., Inc., Koppers-Elex Precipitator Department, 240 Scott St., Baltimore 3, Maryland.

1st with Industrial Gas Cleaning Equipment

Koppers-Elex



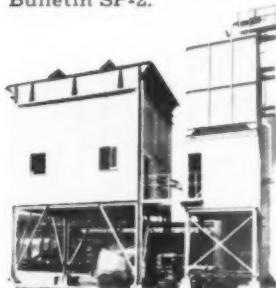
ERIE

37 YEARS

*digging, rehandling,
storing, batching, mixing*

SAND - STONE - CEMENT

In our 37 years, helping to build "A Greater AMERICA", we have developed a complete line of buckets. These are fitted to crane, boom, material and job conditions. Booklet 2L-2 describes our contractor's buckets. ERIE pioneered batch-weighing of aggregates, nearly 30 years ago, and offer a complete line of Aggre-Meter Plants to meet any storage and batching need for sand, stone, cement or other bulk materials. Erie was first to put a complete "Central-Mix" concrete plant on wheels. You can move it up to 30 M.P.H. and make up to 40 cu. yards of concrete per hour on the job. Write for new ERIE Portable Concrete Plant Bulletin SP-2.

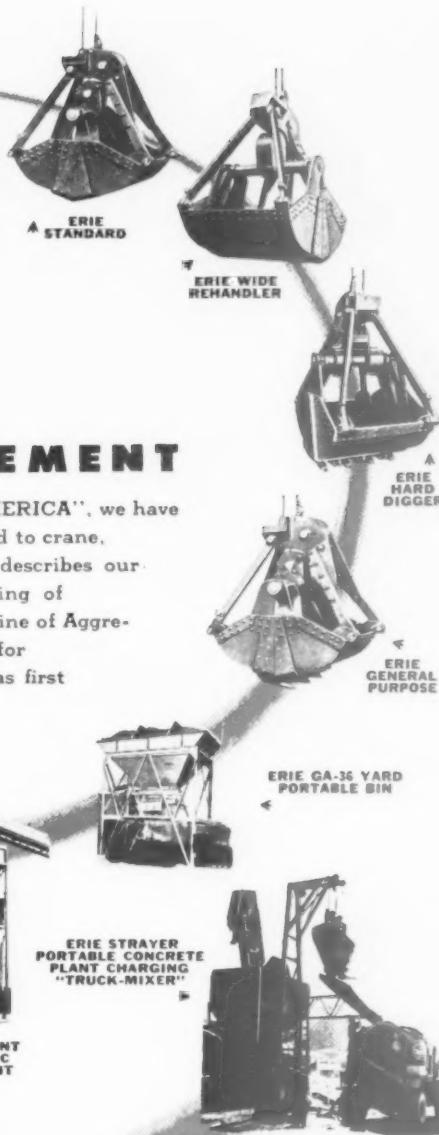


A ERIE TYPE CAB
AGGROMETER PLANT
WITH ERIE TYPE M CEMENT BIN

ERIE

STEEL CONSTRUCTION COMPANY

7910 GEIST ROAD • ERIE, PENNSYLVANIA





G-200R Wagon Drills, mounting 4" drifters, run 24-foot blast holes

fast drilling at any angle

The flexible mounting of the versatile G-200R Wagon Drill adapts it for drilling vertically, horizontally, or at any desired angle — line drilling, toe-hole drilling or bench drilling. The sliding cone, with a 36-inch adjustment, offsets ground irregularities or uneven steel lengths.

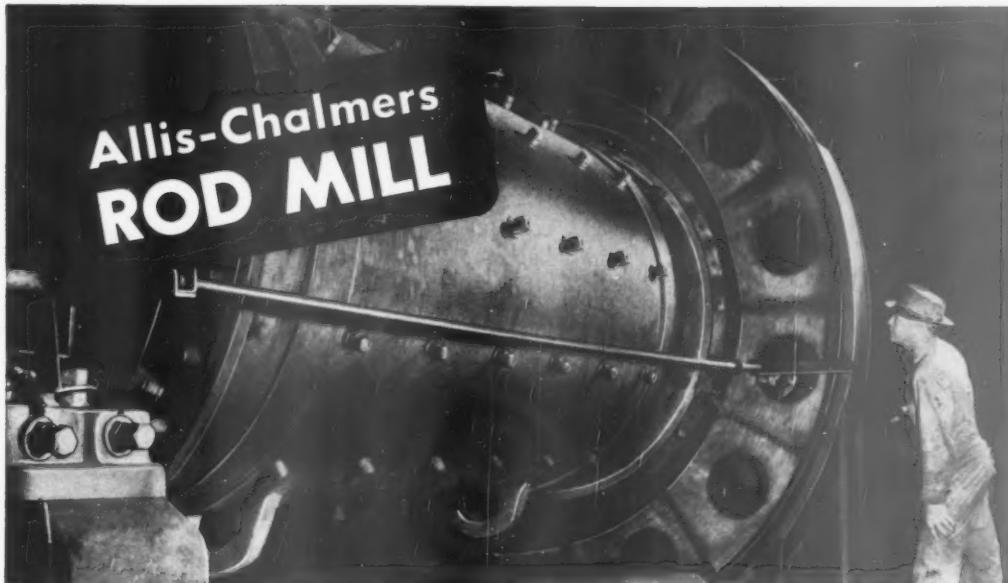
The G-200R provides fast and easy operation of the more powerful CP drifter drills — with great reduction in drilling costs. Its CP rotary air motor gives a steady feed and quick return, with plenty of power for pulling tight steel.

The wheels can be quickly turned at right angles (tandem) to facilitate line drilling or drilling close to ledge or wall.

Available with CP-50N (3"), CP-60N (3½"), or CP-70 (4") drifters.



PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



On the Job 24 Hours a Day...After 27 Years!

MILLIONS OF TONS of sulphide ores have gone through this 6 x 12 ft Allis-Chalmers rod mill in 27 years' operation. On the job 24 hours a day, it grinds 87½ tons per hour, reducing ¾ inch crushed ore to 20-mesh ball mill feed. Sturdiness like this can only be the result of sound mill design.

Allis-Chalmers' experience in building over 4,000 grinding mills makes it possible to offer you these modern features:

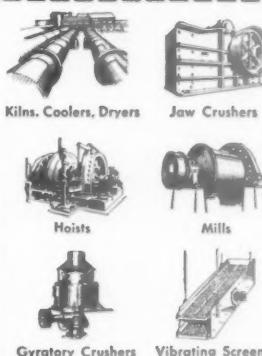
- Heavy welded plate shells, fully "stress-relieved" before machining.
- Self-aligning trunnion bearings are available with pressure pump for "floating" the mill before starting.
- Accurately machined mill heads and shell flanges provide perfect alignment when bolted together.
- Trunnions cast integral with heads for severe service. Fewer parts.

When you choose a grinding mill you'll get top efficiency and economy only if your mill is well-suited to your specific application. Allis-Chalmers builds rod mills, ball mills in both overflow and grate types, pebble mills, and multi-compartment *Ballpeb* and *Compeb* mills in a maximum range of sizes.

Allis-Chalmers mills are available with four types of feeders, three types of drives, a choice of liners and discharge arrangements. This means you'll get the mill that gives you top performance. And Allis-Chalmers furnishes motors, control and V-belt drives—the whole installation from one company.

Sound advice on your grinding problems can be obtained from the A-C representative in your area. Allis-Chalmers offices or distributors are in principal cities in the U.S.A. and throughout the world.

A-2831



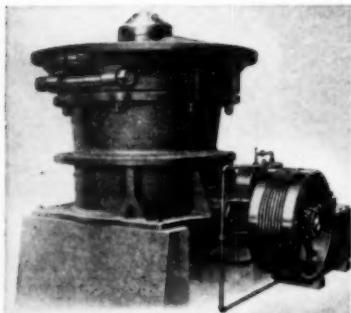
AND OTHER EQUIPMENT
FOR THE CRUSHING, CEMENT
AND MINING INDUSTRIES

ALLIS-CHALMERS, 975A SO. 70 ST.
MILWAUKEE, WIS.
Compeb and *Ballpeb* are Allis-Chalmers trademarks.

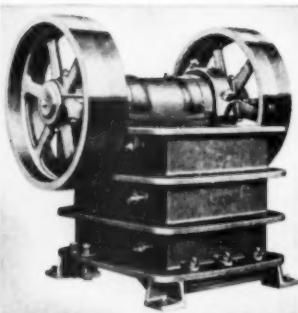


ALLIS-CHALMERS

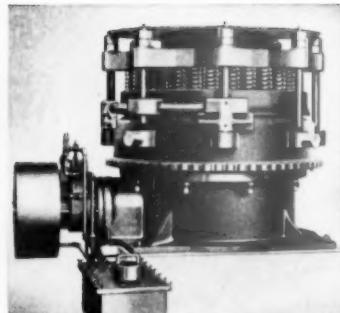
ROCK PRODUCTS, October, 1949



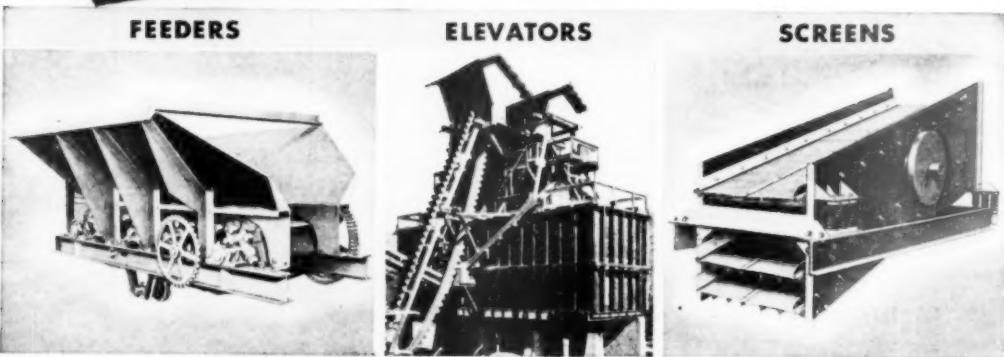
GYRATORY BREAKERS

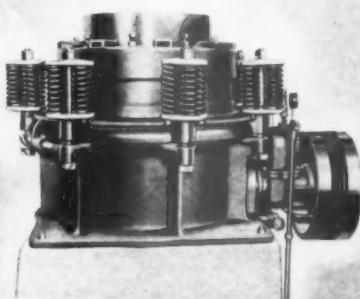


JAW CRUSHERS

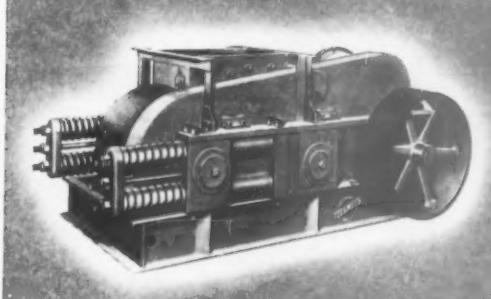


GYRASPHERE CRUSHERS





INTERCONE CRUSHERS



ROLL CRUSHERS

EQUIPMENT

Telsmith engineers design and build *all* types of crushers and an equally wide and varied line of equipment for feeding... screening...washing...classifying...sizing... conveying...loading...in a complete range of models and sizes.

Thus Telsmith engineers can recommend *without bias or prejudice the equipment best suited to your conditions or needs!*

Every piece of Telsmith equipment is designed and built to operate

with equally high efficiency...as a single unit, or as a part of the production line in a plant or process.

Ruggedly built... for heavy and continuous duty. Every modern feature of design...for greater capacity...extra flexibility...lowest upkeep. Telsmith equipment will give you finer sizing...improved products... and *cut your costs!*

Consult Telsmith engineers; get Bulletin 266.

ES-1-R2

SMITH ENGINEERING WORKS, 508 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

Cable Address: Sengworks, Milwaukee

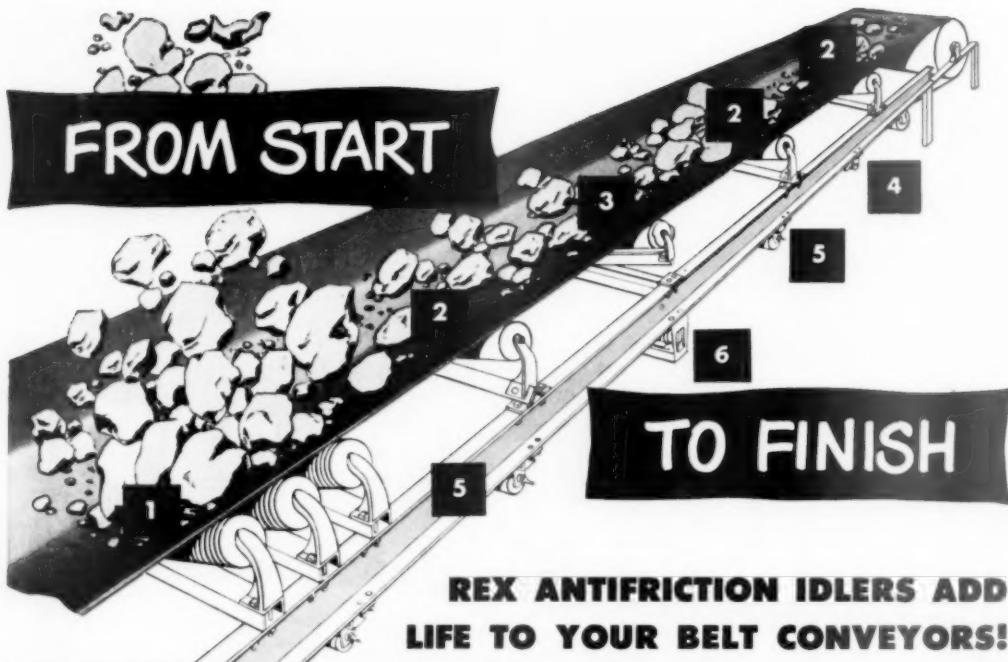
51 East 42nd St. 211 W. Warner Drive 713 Commercial Trust Bldg. 238 Main Street Boehck Eqpt. Co. Brandel's Mach. & Supply Co., Inc.
New York 17, N. Y. Chicago 6, Ill. Philadelphia 2, Pa. Cambridge 42, Mass. Milwaukee 3, Wis. Louisville 8, Ky.
Clyde Equipment Co., Portland 9, Ore. & Seattle 4, Wash. • General Machinery Co., Spokane 1, Wash. • Interstate Equipment Co., Statesville, N. C.
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CLASSIFIERS



CONVEYORS





REX ANTIFRICTION IDLERS ADD LIFE TO YOUR BELT CONVEYORS!



1

REX IMPACT CUSHIONING IDLERS installed under the loading points will take the bumps for your belts . . . minimize ruptures and lacerations. Dual-purpose rubber rolls are scientifically molded with deep primary grooves for maximum cushioning and secondary grooves that provide surface softness to avoid belt laceration.



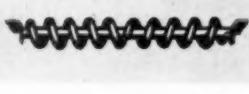
2

REX TROUGHING IDLERS insure minimum service cost and maximum equipment life. Belt friction wear is practically eliminated, and the closely spaced, well-balanced roll units provide an idler assembly that is kind to the belt. There is a type and style for every application.



3

REX SELF-ALIGNING TROUGHING IDLERS automatically align belts without the need for side-guide idlers that impose excessive belt edge wear. They eliminate the misalignments caused by off-center loading, side-wind drifting, warped frames or uneven belt stretch. These idlers fit any belt conveyor frame.



4

REX RUBBER-COVERED SPIRAL RETURN IDLERS create an ever-changing point of contact between belt and idler. Ice, abrasive, corrosive and sticky material cannot build up on the idler and cause premature wear and operating difficulties.



5

REX RETURN IDLERS are dead or live shaft type idlers with hydraulic type fittings for high pressure grease lubrication. They are sturdily built, and their smooth-rolling action cuts belt wear to the minimum.



6

REX SELF-ALIGNING RETURN IDLERS assure automatic belt alignment on the return run. They are similar in general design and effectiveness to the Rex Self-aligning Troughing Idler.

For complete details on these and the many other idlers in the complete Rex line, write for your copy of Bulletin 463-R. Chain Belt Company, 1649 West Bruce Street, Milwaukee 4, Wisconsin.



WICKWIRE ROPE

A PRODUCT OF

CF&I

Ask any user... you'll find them everywhere

In scores of industries, users of Wickwire Rope have developed an affectionate respect for its performance, safety and long life. And, for true economy, they use Wickwire's WISSCOLAY® Preformed. It lasts longer—is easier to cut, splice and install. It's kink-resistant and safer to handle. Wickwire Distributors and Rope Engineers, in key cities everywhere, are prepared to render prompt service in meeting your wire rope needs. Wickwire Rope Sales Office and Plant—Palmer, Mass.

IN THE EAST—Wickwire Spencer Steel Div. of C. F. & I.

500 Fifth Ave., New York 18, N. Y.

IN THE ROCKIES—The Colorado Fuel and Iron Corp.

Continental Oil Bldg., Denver, Colo.

ON THE WEST COAST—The California Wire Cloth Corp.

1080—19th Ave., Oakland 6, Cal.



LOGGING



TRANSPORTATION



MINING



PETROLEUM



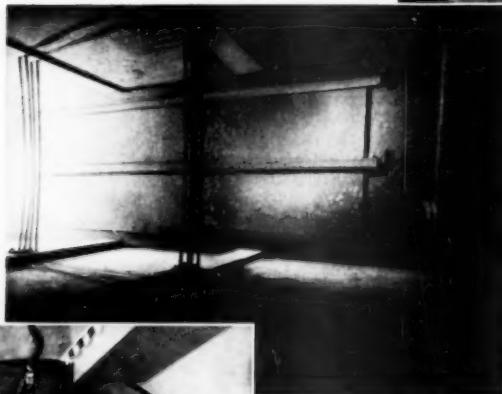
MANUFACTURING



MARINE



CONSTRUCTION



A study in contrasts

Illustrated in this advertisement . . . the old way and the new way to recover and convey finished Portland cement.

The top photo shows an installation of an eight-inch Airslide collecting conveyor. The cement is delivered to this collecting conveyor from flat-bottom storage bins, each bin being equipped with three open-type Airslides installed on the floor of the bins. These Airslides are shown in the center photograph. The collecting conveyor delivers the cement to a Fuller-Kinyon Pump, which may be seen at far end of the conveyor. This Airslide installation replaced a screw conveyor of the same type as shown in photo, lower left.

The F-H Airslide eliminates leaks, dust, noise, lubrication and wear. Lowers power costs to a minimum. Safe—no hazardous moving parts. No screw to become jammed, resulting in shut downs for repairs or replacements, with consequent costly downtime and labor charges. There are many other advantages too numerous to mention. Why not call in a Fuller engineer to make a study of your conveying. No obligation to you.

FULLER COMPANY, CATASAUQUA, PA.

Chicago 3 - 120 So. LaSalle St.

San Francisco 4 - 420 Chancery Bldg.

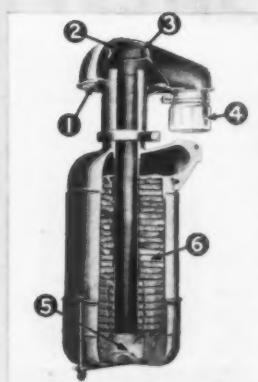


FULLER-KINYON	FULLER-FLUXO	AIRVEYOR	F-H AIRSLIDE	CONVEYING SYSTEMS	ROTARY FEEDERS AND VALVES	ROTARY COMPRESSORS
AND VACUUM PUMPS	MATERIAL COOLER	DRY PULVERIZED	UNITS	INCLINED-GRADE COOLER	MATERIAL-LEVEL INDICATOR	AERATION
AIRLIFT	CONSTANT-HEAD FEEDER	SLURRY VALVES	MOTION SAFETY SWITCH	SAMPLERS		

FH-6

DEPENDABLE POWER

in clouds of dust!



"Caterpillar" Advanced Design
Oil Bath Air Cleaner

Here's real protection for the engine against dust. A pre-cleaner (1) removes large particles of foreign material and by giving a whirling motion to the air (2 and 3) throws out a high percentage of small particles (4). The air passes through a central tube to the bottom of the cleaner (5), is then raised through the outer portion of the air cleaner and, as it does so, is washed on a series of oil-bathed wire screens (6). Air passing through "Cat" air cleaners is free of dust, thereby helping owners realize long trouble-free engine life.



(Price of a D13000 Power Unit with open clutch is \$5949 f.o.b. Peoria, Illinois, subject to change without notice)

Rock-crusher engines are usually operated in severe dust conditions. Such conditions are mighty tough—so tough, engine seals and air cleaners must do double duty. Powering rock crushers all over the world, "Cat" Diesel Engines have proved their ability again and again to stand up under the most punishing treatment. And the two D13000s and the D8800 working for M. M. Beard of Knoxville, Iowa, are no exception.

Operating 10 hours daily, 25 days a month, these rugged "Cat" Diesels power a "Cedarapids" jaw crusher and a Gruendler hammermill. Rock output averages 700 to 800 tons per day. "Our condition is as rough as you can get—wet limestone is tough," Foreman Asa Marshall comments. "Our 'Cat' Engines are doing a swell job for us."

Besides these three engines, M. M. Beard owns a "Cat" Electric Set and "Caterpillar" RD6 track-type Tractor. Maintenance and parts service is excellent—the kind that is counted on, when and where needed, from the nearby, well-equipped "Caterpillar" dealer. Let your "Caterpillar" dealer give you job-proved facts and figures on the dependable, low-cost performance of "Cat" Engines. He's as close as your phone—call him today.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR
REG. U. S. PAT. OFF.

DIESEL ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

CATERPILLAR TRACTOR CO.

Box RP-10, Peoria, Ill.

Send me, without obligation, booklet: "The Right Combination for Crushing."

Name _____

Address _____

City _____

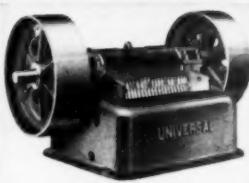
State _____

IN STATIONARY AND PORTABLE CRUSHING PLANTS UNIVERSAL BASIC UNITS MEAN *MYPH AT LCPY*

MORE YARDS PER HOUR AT LESS COST PER YARD

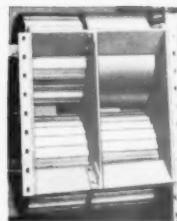
UNIVERSAL JAW CRUSHERS

With overhead eccentric principle originated by Universal. Force feed, force discharge. 4 types with plain or roller bearings. Tough reversible manganese steel jaws, simple adjustment for product size. A size and capacity to meet every need. Series "SL" Streamline illustrated. Bulletin 100B.



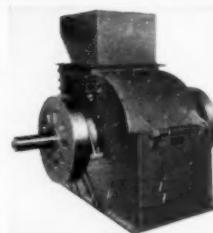
UNIVERSAL TWINDUAL ROLLS

Exclusive with Universal 293-Q Portable Quarry Plant, the Twin Dual Master Gravel Plants, and TwinDual Secondary Plants. Two stages of secondary reduction with one crusher. Permits up to 100% wider primary discharge opening. Amazing capacities and lower maintenance cost. Bulletins 31AA, 682A and U30S.



UNIVERSAL HAMMERMILLS

For profitable production of aggregate and road rock up to 1½ inch. Roller bearing, welded steel plate construction. Manganese steel hammers and liners. Made in 4 sizes with capacities up to 100 tons per hour. Ask for bulletin 55B.



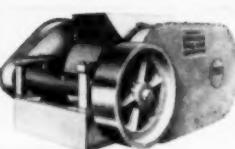
UNIVERSAL CONVEYORS

Sectional lattice or channel types. Rigid construction, easy to move—easy to set up. Anti-friction bearings throughout. Troughing rolls and return idlers are equipped with sealed-for-life bearings. Self-cleaning pulleys are provided where needed to protect belts. Available in multiples of 4' lengths in 18, 24, 30, and 36 inch belt widths. Portable type has hydraulic hoist truck. Ask for Bulletin 46-7A.



UNIVERSAL DOUBLE ROLL SECONDARY CRUSHERS

Star gear final drive. Roller bearings, manganese steel roll shells. These crushers feature simplicity of design, greater capacity, double safety against tramp material, easy adjustment for product size, and strength for the toughest jobs. Built in sizes to meet every secondary crushing requirement. Bulletin 6B.



UNIVERSAL TROUGHING ROLLS

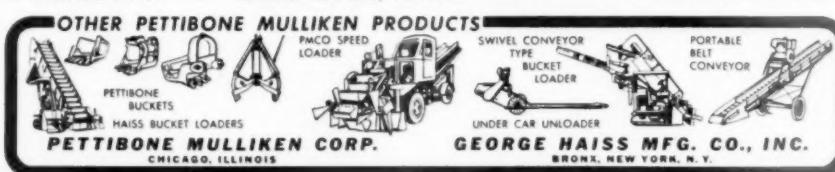
Made of heavy seamless steel tubing with end sections rolled in place. Self-aligning shaft locked in position. Mounted on a combination welded and pressed steel base and brackets. Anti-friction sealed-for-life bearings. A complete line of conveyor parts for new construction or repairs. Details in Bulletin 46-7A.

Other Basic Units available include: GYRATING AND REVOLVING SCREENS, ROTOVATOR, SCRUBBERS, SAND SCREWS, LOG WASHERS, STEEL BINS AND APRON FEEDERS.

UNIVERSAL ENGINEERING CORPORATION

617 C AVENUE N.W. • CEDAR RAPIDS, IOWA PETTIBONE MULLIKEN CORPORATION • New York • Chicago

A DIVISION OF



GEORGE HAISSE MFG. CO., INC.
BRONX, NEW YORK, N.Y.



... and take it away. Good digging means lower costs per yard, more yards per minute.

Primacord detonates throughout its length, at a speed of about four miles per second! Down-hole lines are in direct contact with the entire charge, even in deck loads; and detonate each cartridge with full power. Main lines connect all holes in a planned sequence of fire power to relieve burden and produce better fragmentation.

Add the fact that Primacord is easy to hook up without tools—is resistant to ordinary shock and stray electrical currents — can be used in wet weather — and you have many added profitable reasons for using it in your blasting.

There's a grade of Primacord to meet every blasting condition. Ask your supplier about it, or write direct to The Ensign-Bickford Company, Simsbury, Connecticut.

P-24

PRIMACORD-BICKFORD Detonating Fuse •

Also Ensign-Bickford Safety Fuse Since 1836



• Users asked for it! Here it is! Now, a big-producing $\frac{3}{4}$ -yd. Lorain TL-25 that gives you more of everything for your money! More output—with the big-producing $\frac{3}{4}$ -yd. dipper! More weight—and greater crane capacities. This new addition to the Lorain line brings you the most modern machine of its class...with more features for high production and long life. Here are 16 plus values in the new Lorain TL-25... (1) INTERCHANGEABLE MAJOR COMPONENTS (2) 5 IDENTICAL SHOE CLUTCHES (3) ANTI-FRICTION BEARINGS (4) OIL-ENCLOSED CUT GEARS (5) INTERCHANGEABLE PARTS (6) A ONE-PIECE TURNTABLE BED (7) HOOK ROLLERS (8) STANDARD AND WIDE GAUGE CRAWLERS (9) EXTRA-LONG CRAWLERS FOR DRAGLINES (10) TWO CRAWLER SPEEDS (11) DROP FORGED TREADS (12) POSITIVE TRAVEL LOCK (13) "FULL CIRCLE" STEERING (14) POSITIVE INDEPENDENT SHOVEL CROWD (15) ALL-PURPOSE CRANE BOOM (16) GOOSENECK HOE BOOM.

Plan now to equip your next job with the stand-out $\frac{3}{4}$ -yd. Lorain TL-25... Your nearby Thew-Lorain Distributor will give you all the details!

THE THEW SHOVEL CO., LORAIN, OHIO



THEW • Lorain®



SHOVELS • CRANES
DRAGLINES • HOES
CLAM SHELLS

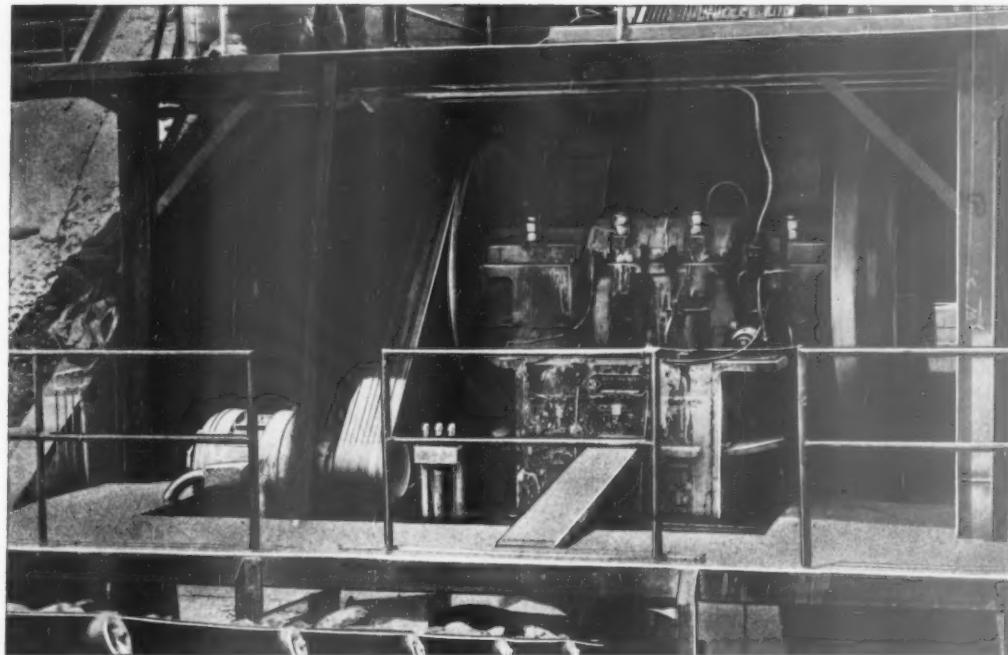
A NEW $\frac{1}{2}$ -YD. LORAIN



For The Smaller Jobs

The new TL-15 rounds out the "TL" series. It's a lighter $\frac{1}{2}$ -yd. version of the TL-25—with shorter tail swing and narrower crawler mounting—yet gives you the outstanding plus values of the TL-25. Here's the best $\frac{1}{2}$ -yd. buy for your money.

Get the New Lorain TL-25 and TL-15 story from your Thew-Lorain Distributor.



Azusa Rock & Sand Co. Cuts Costs with "A-1" Jaw Crusher

CALLED "ONE OF THE most efficient crushing plants in the country," Azusa Rock & Sand Co. of California installed this 42x32 in. "A-1" jaw crusher to break gravel boulders, some as large as 30 inches. Feed runs 100 to 200 TPH; sometimes as high as 250 TPH.

Heavy-going demands like this have been everyday routine, six days a week, for this Allis-Chalmers machine since 1946. Yet, the original main bearings are still going strong. Operation has been practically trouble-free. Only jaw plates and toggle bearings have been replaced.

MANPOWER ECONOMY

Convenient all-electric controls regulate feeder, crusher and belt conveyor to surge pile. All controls are sequence interlocked. Only one operator is needed.

ALLIS-CHALMERS, 975A SO. 70 ST.
MILWAUKEE, WIS.

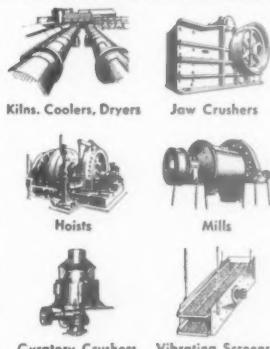
"A-1" is an Allis-Chalmers trademark.

CHECK THESE "A-1" FEATURES

- No choking or packing in the "A-1" jaw crusher — crushing is uniformly distributed throughout the entire depth of the crushing chamber.
- Jaw opening nips biggest pieces with minimum slippage.
- Renewable parts protect expensive castings from wear, greatly prolong crusher life.
- Automatic lubrication of main pitman and swing jaw bearings.

Find out more about "A-1" jaw crushers and other Allis-Chalmers crushers from the A-C representative in your area. Or write for Bulletin 07B6369A. Allis-Chalmers offices or distributors are in principal cities in the U.S.A. and throughout the world.

A-2817



AND OTHER EQUIPMENT
FOR THE CRUSHING, CEMENT
AND MINING INDUSTRIES

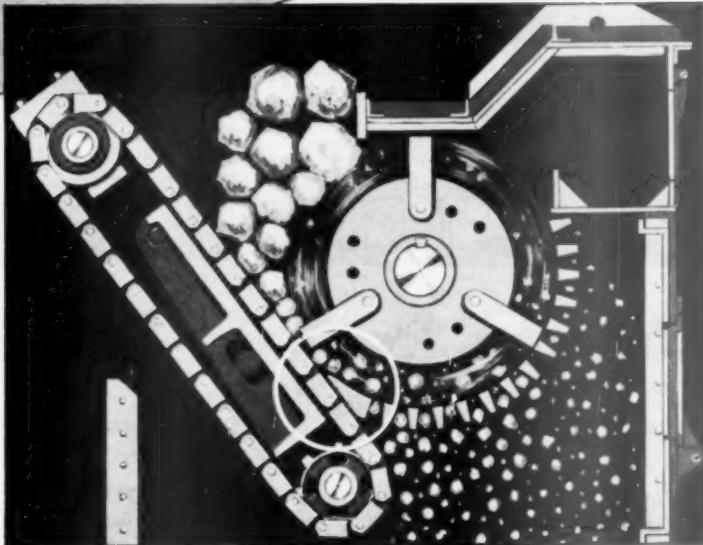


ALLIS-CHALMERS

ROCK PRODUCTS, October, 1949



Better crushing begins here! Cross section drawing illustrates "heart" of Dixie Non-Clog Hammermill where Extended Moving Breaker Plate construction guards against passage of oversize material . . . results in improved grinding control for unvarying uniformity of product.



Your ASSURANCE of GREATER PRODUCTION at LESS COST

The one and only Dixie NON-CLOG Moving Breaker Plate Hammermill* sets a new standard of crushing efficiency in the reduction of wet, sticky materials.

If you have wet, sticky material to crush, if you have difficulty in reaching and maintaining desired production, if you have any crushing problem at all, it will pay you to take advantage of this vastly improved crushing principle.

Dixie Non-Clog Hammermills are made in sizes ranging from 24" up to 72" diam.

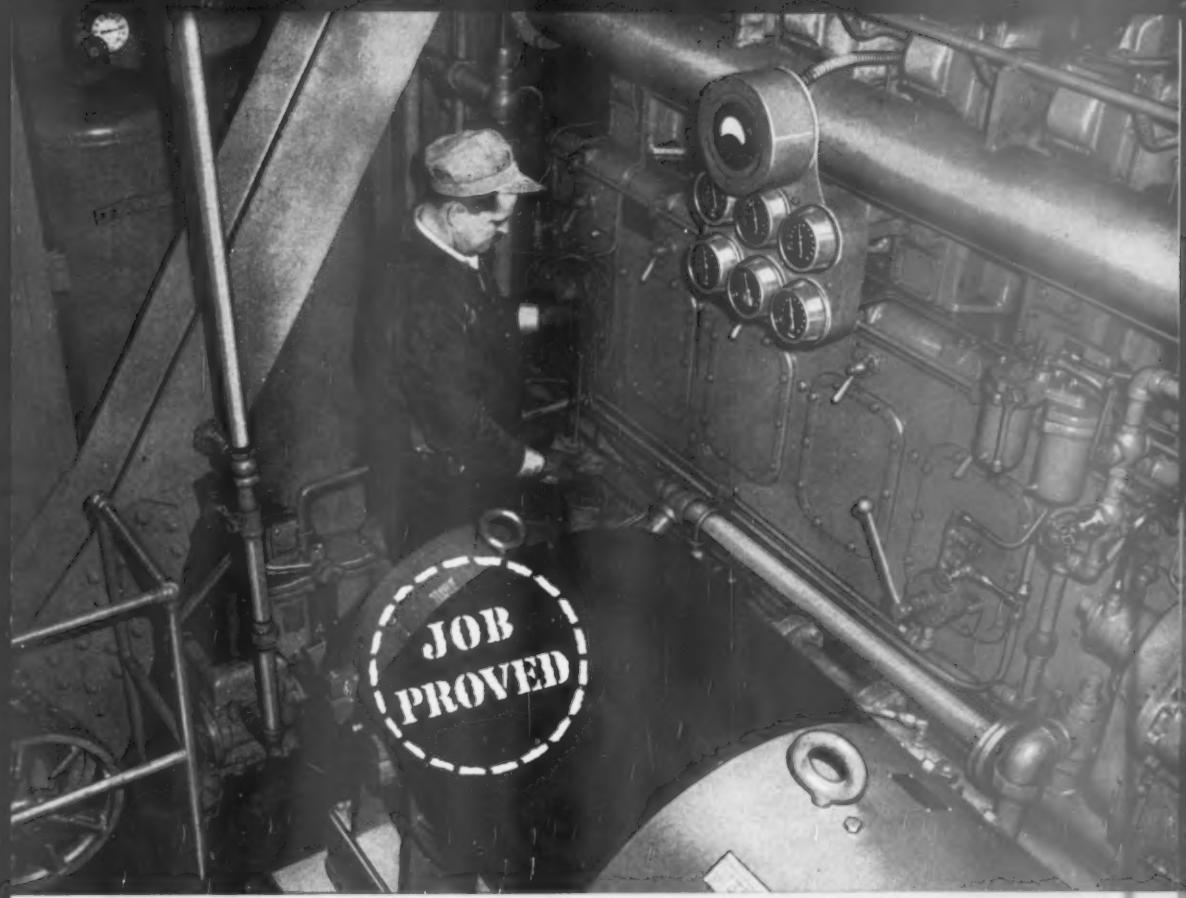
* U. S. Patents
Granted & Pending

WRITE TODAY FOR COMPLETE DETAILS

DIXIE

MACHINERY MFG. CO.

MAIN OFFICE AND PLANT
4202 Goodfellow Ave., St. Louis 20, Mo.



SUNVIS OIL PROTECTS BIG DRAGLINE

**Diesel Operates 24 Hours a Day for 6 Months,
Engine Free of Sludge and Carbon**

A coal company operating a \$160,000 diesel-powered dragline shovel in strip mining operations selected an oil of the Sunvis 700 H.D. Series to lubricate the engine from the very first day. This heavy-duty detergent oil was chosen on the strength of its "Job Proved" performance in the industry.

In six months of use, the shovel has worked round the clock with

no need for repairs traceable to lubrication. A recent inspection showed the engine to be free from sludge and carbon and as clean as the day it was put in operation. Steady, peak production has made the owners enthusiastic about this top-notch lubricant.

Sun "Job Proved" Products are widely used throughout the quarrying and coal mining industries, and

everywhere they are establishing similar fine records.

A Sun representative will be glad to give you detailed recommendations as to the correct oils and greases you need to protect all your production, transportation and preparation equipment. The making of a complete survey will not obligate you in any way. Call or write the nearest Sun Office.

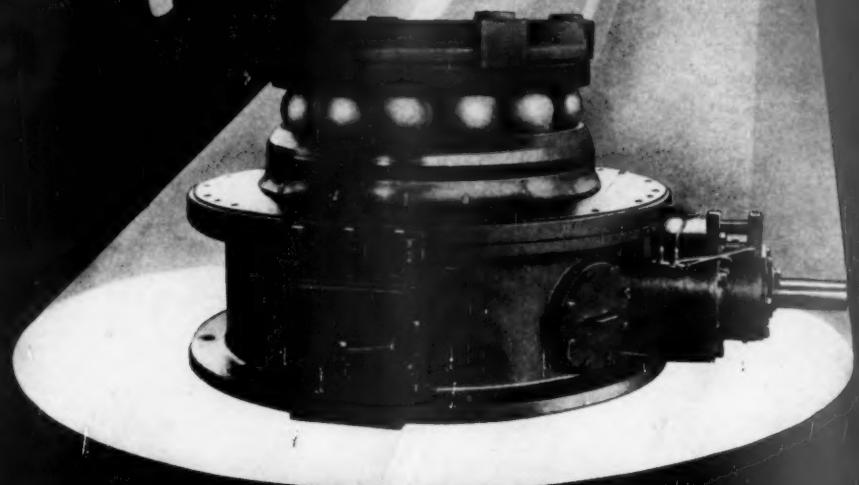
SUN OIL COMPANY • Philadelphia 3, Pa.

*In Canada: Sun Oil Company, Ltd.
Toronto and Montreal*

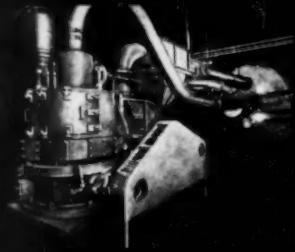
SUN PETROLEUM PRODUCTS
"JOB PROVED" IN EVERY INDUSTRY



Popular



BECAUSE OF CONSISTENTLY UNIFORM FINENESS



One reason why B&W Type E Pulverizers have won wide acceptance for kiln-firing is the fact that they deliver coal of uniform fineness and at closely controlled, constant rates, regardless of wear of the grinding elements.

The result is efficient and economical firing and maximum kiln-production with wet or dry coal of widely varying grades.

proved at 139 installations



**BABCOCK
& WILCOX**

everybody gains from this St. Regis valve bag filling machine

ECONOMICAL PACKAGING for the cement manufacturer.

CLEANER PLANT for the cement operator.

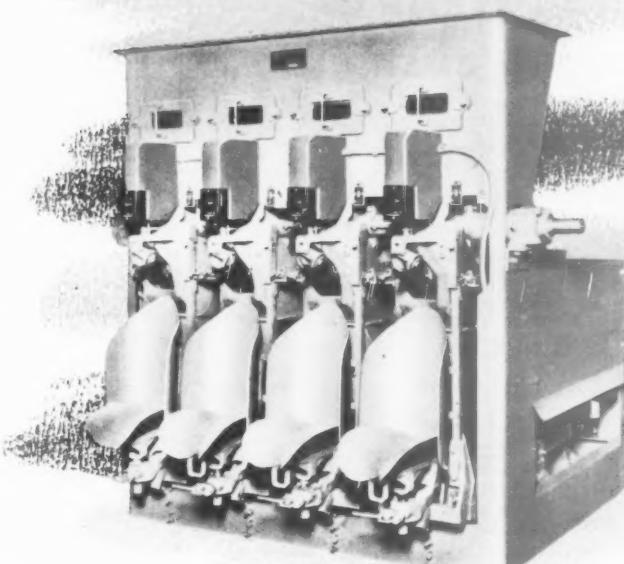
BETTER PACKAGE for the cement dealer.

Because of the "delayed discharge" of this St. Regis 150 FC packer, which enables trapped air to escape from the bag, cement plants are cleaner and healthier places to work.

This is a real benefit to the manufacturer because it improves output, results in greater overall economy in the packaging operation.

It also helps the cement plant operator because he is more content working in a healthier atmosphere.

And the cement dealer is pleased too because the attractively printed Multiwall bag provides a cleaner, more saleable package.



SALES SUBSIDIARY OF ST. REGIS PAPER COMPANY

ST. REGIS
SALES CORPORATION
230 PARK AVENUE • NEW YORK 17, N. Y.

YOU BUY PROTECTION WHEN YOU BUY MULTIWALLS

Allentown, Pa. • Atlanta
Baltimore • Birmingham
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CHASE BAGS

LET'S MEASURE THE
BENEFITS
IN TERMS OF
YOUR BUSINESS . . .

Check every one of these important features of Chase Bags. They're important to you because they represent our efforts to assure good will . . . and increase your sales.

Today, more than ever before, management is demanding better display of its premium products . . . and better protection of its premium products.

That's why you, too, should check today on Chase Bags—the containers which have been carrying American products for more than 100 years.

Your Chase Salesman is a Packaging Expert who will be glad to help provide a more economical and more efficient container for your product. Don't delay—write us today on this important subject.



CHASE BAG Co.

GENERAL SALES OFFICES, 309 WEST JACKSON BLVD., CHICAGO 6, ILL.

BOISE • DALLAS • TOLEDO • DENVER • DETROIT • MEMPHIS • BUFFALO • ST. LOUIS • NEW YORK • CLEVELAND • MILWAUKEE
PITTSBURGH • KANSAS CITY • LOS ANGELES • MINNEAPOLIS • GOSHEN, IND. • PHILADELPHIA • NEW ORLEANS • ORLANDO, FLA. • SALT LAKE CITY
OKLAHOMA CITY • PORTLAND, ORE. • REEDSVILLE, N. C. • HARLINGEN, TEXAS • CHAGRIN FALLS, O. • HUTCHINSON, KAN. • CROSSETT, ARK.

...DEPENDABLE MATERIALS
PROTECT YOUR PRODUCTS

2
...ESPECIALLY DESIGNED
FOR YOUR PRODUCTS

3
...ATTRACTIVE PRINTING
FOR YOUR PRODUCTS

4
...DISTINCTIVE APPEARANCE
FOR YOUR PRODUCTS

5
...MORE SALES APPEAL
FOR YOUR PRODUCTS

6
...FOR BETTER ACCEPTANCE
OF YOUR PRODUCTS



It's the

III-M MARION

**WITH
WARD-LEONARD CONTROL!**

*It has what
it takes to
move mountains
of rock!*



IT'S FAST! IT'S POWERFUL! IT'S ECONOMICAL!

Here's the new all-electric version of the MARION III-M, a 3½-4 cubic yard machine that's setting production records across the country. It's a blend of speed, power and

economy that gets big jobs done quickly. Delivery dates?—earlier than you might think. Why not check your nearest MARION District office or agent today?



MARION
POWER SHOVEL COMPANY
MARION, OHIO, U.S.A.
Offices and Warehouses in all Principal Cities

Amsco-nagle MATERIALS HANDLING **Pumps**

1. Simple design—only three wearing parts.
2. Easy replacement of impeller, casing, and plate without disturbing bearing stand or drive.
3. Water end parts of austenitic manganese steel or ABK Metal, whichever is best suited for the particular job.
4. Stuffing box accessible from above or below.
5. Split bearing stand—easy to dismantle.
6. Initial high efficiency maintained with slippage seal adjustment.
7. Oversized, grease lubricated, deep-grooved ball bearings for long wear with minimum servicing.

*Good for
BAD mixtures*

No matter how abrasive the material to be pumped, or how laden with solids, there is an Amsco-nagle Pump for the job. In the pumping of slurries, coal fines, sand and gravel aggregates, sludge and similar materials, an Amsco-nagle will out-pump and outwear ordinary equipment by a substantial margin. In many applications Amsco-nagle Pumps are per-



Amsco-nagle 6" Type "T" frame pump for handling surplus sand at the Chillicothe, Ohio plant of Southern Ohio Quarries Company.

forming with satisfaction where other pumps have failed.

Amsco-nagle pumps are manufactured in sizes 6" to 16", for capacities up to 10,000 G. P. M. and for heads up to 200 feet (250 feet for certain applications). We will be glad to supply you with full information. Write for Bulletin 547-IP for data on all types of Amsco-nagle Industrial Pumps.

**AMERICAN
Brake Shoe
COMPANY**

**AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILL.**

Foundries at Chicago Heights, Ill., New Castle, Del., Denver, Colo., Oakland, Calif., Los Angeles, Calif., St. Louis, Mo.
Offices in principal cities. In Canada: Joliette Steel Limited, Joliette, Que.

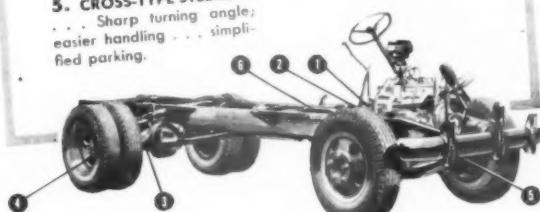
More-for-your-money... DODGE "Job-Rated" TRUCKS

**PRICED
WITH THE
LOWEST!**



NEW Dodge B-2 Series Chassis Features

- 1. **SUPER-FRICTION CLUTCHES.** Large frictional areas. "Job-Rated" for smooth action and long life.
- 2. **RUGGED 3-, 4- or 5-SPEED SYNCHRO-SHIFT TRANSMISSIONS** — "Job-Rated" for the load. Carburized gears; heat-treated shafts; antifriction bearings throughout.
- 3. **FULL-FLOATING REAR AXLES** . . . Hypoid design; banjo-type housing . . . "Job-Rated" for the load. Long life . . . low upkeep cost.
- 4. **CYCLEDONED** brake linings (no rivets) prolong brake life.
- 5. **CROSS-TYPE STEERING** . . . Sharp turning angle; easier handling . . . simplified parking.
- 6. **SAFETY-LOCATED GAS TANKS** . . . Outside the cab, NOT inside!



- **FAMOUS DODGE L-HEAD TRUCK ENGINES** . . . "Job-Rated" for your loads. Save gas, oil—cut service expense.
- **COMPLETELY SPLASH- AND DUST-PROOF ELECTRICAL SYSTEM** . . . with high-output generator. Resistor-type spark plugs, and high-output coil, provide amazingly smooth engine operation; insure longer plug life.
- **EXHAUST VALVE SEAT INSERTS** . . . resist wear, pitting. Reduce valve grinding; preserve performance.
- **REPLACEABLE PREFITTED MAIN BEARINGS** . . . precision, long-life quality. Reduce maintenance costs.

NEW Dodge B-2 Series Engine Features

THEY'RE more-for-your-money any way you look at them!

Read why . . . on this page. See why . . . at your Dodge dealer's.

New B-2 Series Dodge "Job-Rated" trucks are designed throughout to last longer . . . to save you money!

Compare them—feature for feature, price for price, value for value—with any other trucks! Know what you're getting for what you pay.

Switch to Dodge. See your Dodge dealer . . . now . . . and *save money!*

- **FULL-LENGTH CYLINDER COOLING** . . . uniform cooling of cylinders, protects . . . reduces wear.
- **4-RING ALUMINUM ALLOY PISTONS** . . . for top performance; longer bearing life; low oil consumption.
- **FULL-PRESSURE LUBRICATION** . . . positive pressure to main, connecting rod and camshaft bearings and camshaft drive; prolongs engine life.
- **OIL-BATH AIR CLEANER** . . . highly effective in protecting the engine from dust and dirt.

356 BASIC CHASSIS MODELS, RANGING FROM 4,250 TO 23,000 LBS., G.V.W.

ROCK PRODUCTS, October, 1949

THE BEMIS MAN IS CLOSE AT HAND



... TO GIVE YOU THE BEST
IN MULTIWALL SERVICE

When you can't estimate your future Multiwall needs right on the button, it's handy to have a supplier near for prompt service.

With the facilities of seven Bemis Multiwall plants available through thirty-six sales offices across the country, you are in a much better position to keep your multiwall supply in line with your needs.



Bemis

"America's No. 1 Bag Maker"

Pearl, Ill. • East Pepperell, Mass. • Mobile, Ala. • San Francisco, Calif. • Wilmington, Calif.

Vancouver, Wash. • Houston, Texas

Baltimore • Boise • Boston • Brooklyn • Buffalo • Charlotte • Chicago • Cleveland • Denver • Detroit

Indianapolis • Jacksonville, Fla. • Kansas City • Los Angeles • Louisville • Memphis • Minneapolis

Norfolk • New Orleans • New York City • Oklahoma City • Omaha • Phoenix • Pittsburgh • St. Louis

Salina • Salt Lake City • Seattle • Wichita



AIRCO
HARDFACING
ALLOYS

**add 2 to 25 times
LONGER SERVICE LIFE
to new and worn parts**



SEVERE ABRASION

Pug mill knives, coke crusher rolls, mill guides and similar equipment, when hardfaced with Aircolite last many times longer, and at the same time give superior operating efficiency. For extreme earth abrasion, Airco Tungtube (tungsten carbide) is recommended.

IMPACT

Parts subjected to impact, like bucket lips, last longer when hardfaced with Airco Electric Self Hardening Alloy. Furthermore, parts can be rebuilt with this alloy at a fraction of new part cost. For shattering impact, Airco No. 388 is recommended.



HEAT and CORROSION

Aircloy 1 and 6 effectively resist wear caused by heat and corrosion . . . for example, parts subject to intense heat, such as ingot tong bits, exhaust valves and seats, tap hole augers, and hot punches, last from 2 to 25 times longer when protected with these NEW Airco Hardfacing Alloys.



BUT TRY A FEW OF THESE NEW AIRCO HARDFACING ALLOYS YOURSELF
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you receive a trial assortment of Aircolite (for oxy-acetylene and electric application) and Airco Electric Self Hardening Alloys, plus instruction sheets for each of these two alloys and a booklet describing the complete line of Airco Hardfacing Alloys.

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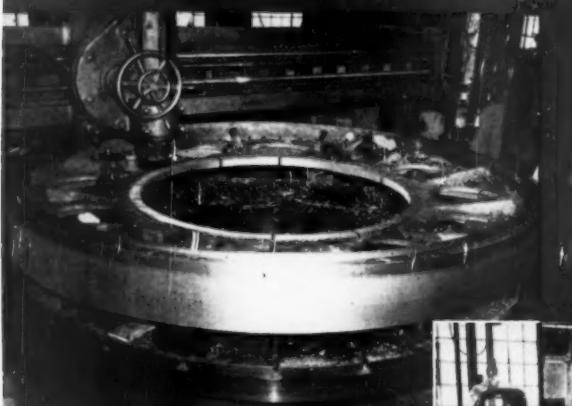
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Long and Short Addendum
Cut Tooth Spur Gearing

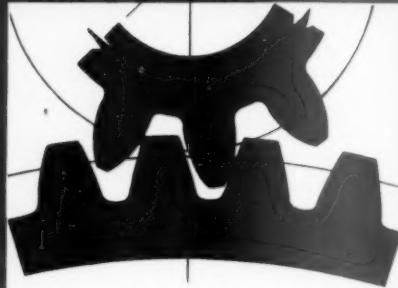


The gear being cut is to transmit 500 HP at 900 ft. per min. P.L.V., but is cut to such specifications that it could carry the same Transmitted load at double the P.L.V., without excessive chattering and vibration.

The teeth on the gear blank are form milled, and are spaced from a master index plate—a method of cutting and spacing which eliminates entirely the pitch error due to a non-uniform rotation of a blank introduced by some commercial methods of cutting and indexing.

LONG ADDENDUM PINION TEETH

SHORT ADDENDUM GEAR TEETH



LAYOUT 20° INVOLUTE LONG AND SHORT ADDENDUM GEAR TEETH FOR BLANK BEING CUT

Compared with Standard 14½° Involute Gearing, these teeth have the following advantages:

1. Freedom from interference.
2. Greater continuity of action.
3. Less sliding action between teeth.
4. Lower intensity of pressure built up by load.
5. Stronger teeth.

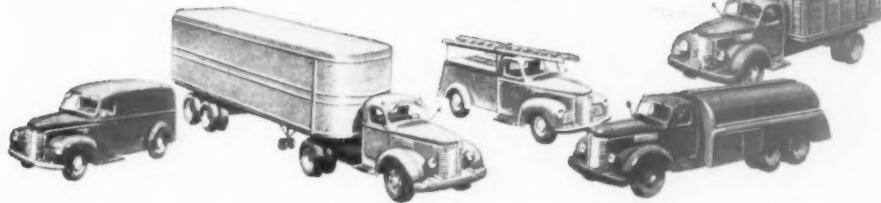
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Longer Wearing Life.*



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3 More than half of all International Trucks ever built—in 42 years—are still at work. International has been building rugged trucks uncompromised by passenger car design or construction since 1907. International Trucks are built to last—and they do.

4 International Trucks are backed by America's largest exclusive truck service organization. 4,700 Dealers and 170 Company-owned Branches offer complete International Truck service wherever you drive a truck. Precision-engineered replacement parts, factory-rebuilt exchange units, and factory-trained mechanics are as close as your telephone. For the right truck to solve your hauling problems, see your nearest International Dealer or Branch.



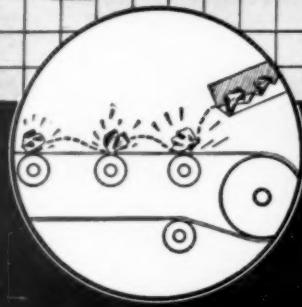
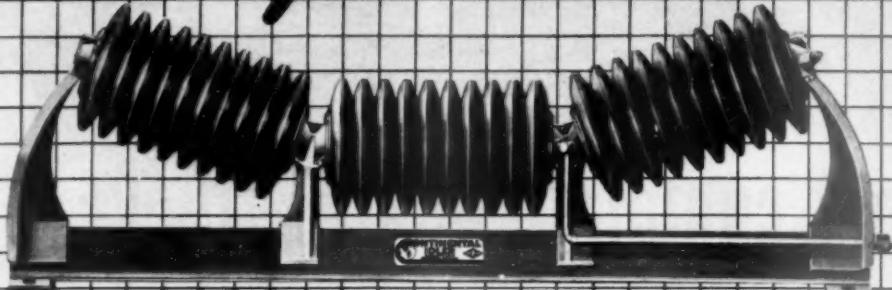
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ROCK PRODUCTS, October, 1949

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Ed498

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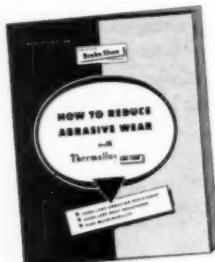
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A "Tip" WORTH NOTING

THERMALLOY HC-250 OUTLASTS PREVIOUS MATERIAL *4 to 1*



GET THE FACTS about Thermalloy HC-250. This new bulletin gives advantages, properties, suggested applications.

The unretouched photograph above shows that Thermalloy* HC-250 can really "take it" under extreme abrasion conditions.

Formerly the mixer tips and end liner plates of this asphalt blower had to be replaced at least twice each season. Downtime is costly with seasonal work of this type. Then Thermalloy HC-250 was tried.

This photograph was taken after two complete seasons. The mixer tips show some wear, but still have many months of service life left. End liner plates are still in excellent condition — do not need replacement.

In addition to its abrasion resistance, which is surpassed only by expensive hard facing materials, Thermalloy HC-250 withstands temperatures up to 1800°F and can be annealed for machining.

Why not find out how Thermalloy HC-250 can help solve your abrasion problems? Call in your nearest Electro-Alloys engineer, or write for bulletin T-176. Electro-Alloys Division, 2013 Taylor Street, Elyria, Ohio.

Specify **THERMALLOY*** for heat and abrasion resistance . . .
CHEMALLOY* for corrosion resistance.

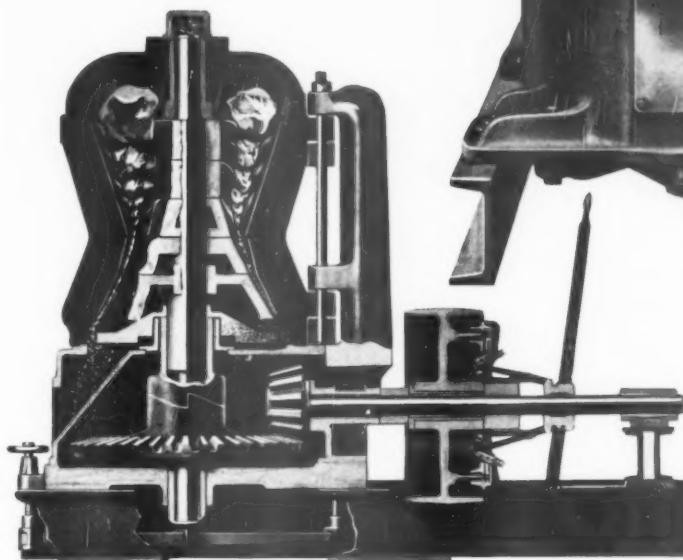
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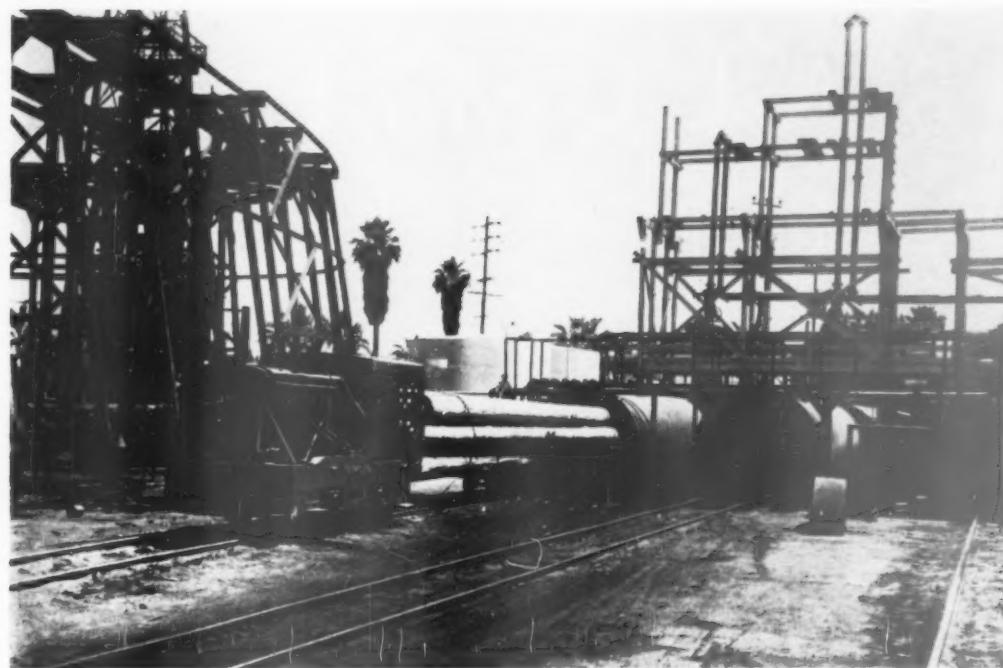
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This PLYMOUTH LOCOMOTIVE has been a tireless worker for 25 years!

The American Lumber and Treating Co., producers of "Wolmanized" pressure-treated lumber, "Minalith" fire-retardant lumber and creosoted lumber, has operated this dependable Plymouth for 25 years. Mr. J. T. Napier, Superintendent of the Wilmington, California, plant, writes: "The locomotive is easy to handle and has given very good service."

This 7-ton, gasoline powered Plymouth hauls and switches tram cars loaded with timber, piling and ties at less than half the cost of former methods. American Lumber and Treating Co. reports that ease in handling with speed and efficiency in switching and transport-

ing cars a full 40 hour week are important factors in keeping transportation costs at a minimum.

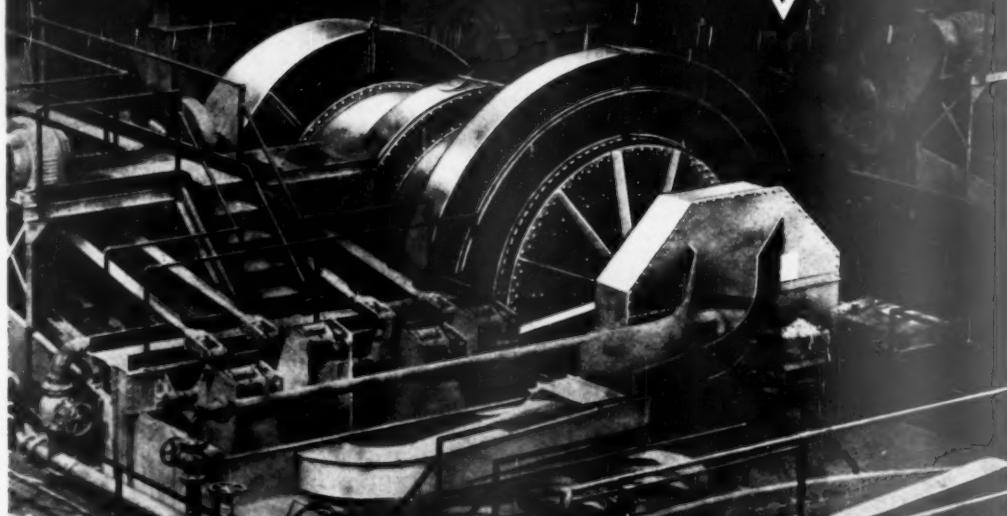
That record of long dependable service is typical of Plymouth operation everywhere. For every industry, intra-plant hauling problems are simplified, costs reduced when sturdy Plymouth goes to work.

Standard or narrow gauge Plymouth Locomotives are engineered for gasoline-mechanical, diesel-electric or diesel-mechanical power. Write for free bulletin to learn the many cost-cutting advantages of Plymouth Locomotives in your plant. Plymouth Locomotive Works, Dept. A-5, Plymouth, Ohio.

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"WE HEAR..."

October, 1949

A return to pre-war thinking about WPA and PWA types of federally financed make-work projects is in evidence again in view of decreasing employment. Rep. John A. Blatnik of Minnesota has introduced a bill providing for the expenditure of \$10 billion of federal funds to finance a large scale public works program of national scope. He declares that there exists a backlog of \$126 billion worth of needed and worthwhile public projects including \$60 billion for new roads. The House Rules Committee was asked to permit action on a bill to use a part of the highway appropriation to provide \$40 to \$45 a week jobs for day labor. In Massachusetts, legislators have advocated use of \$20,000,000 to help relieve the economic pressure of decreasing employment.

* * * * *

Apparently spurred by the success of toll highways in the East, Colorado legislature has passed a bill to permit construction of a \$5,000,000 toll road in Colorado, between Denver and Boulder. In Ohio, the governor has signed into law a measure creating a turnpike commission authorized to build toll highways; and the governor of Oklahoma has signed a law extending the life of the Turnpike Authority by two years.

* * * * *

American motorists in 1948 paid an all-time record high of nearly 3% billion dollars in special motor vehicle taxes, the Automobile Manufacturers Association reports. This was an increase of more than 12 percent over the 1947 total. Nearly one-third of the total was derived from the operation of motor trucks which comprised less than 18 percent of the nation's total motor vehicles registered last year. For the first time in history, special truck taxes in 1948 exceeded the billion dollar mark, nearly equaling the total of all special motor vehicle taxes for the year 1933.

* * * * *

Hourly wage scales of union workers in seven selected building trades in 25 cities in the north central area of the United States advanced an average of 12 cents in the year since July 1, 1948, according to the U.S. Bureau of Labor Statistics. The hourly union pay scales for bricklayers, carpenters, electricians, painters, plasterers, plumbers and laborers average \$2.19, varying from \$2.55 for bricklayers to \$1.54 for laborers.

* * * * *

Although value of new construction put in place this year is expected to reach \$19,000,000,000, builders and contractors "will require somewhat smaller quantities of many materials than they did for the \$18,800,000,000 of new work done last year," the Department of Commerce has announced. Drop in some materials requirements is expected despite an anticipated increase in total physical volume as well as in dollar value of new construction; however, the amounts of cement and concrete reinforcing bars needed will be larger, and there is an expected increase in the use of portland cement to a total of 198,000,000 bbl., 8,000,000 more than last year. Smaller increases are looked for in consumption of gypsum board and lath.

* * * * *

Michigan contractors know just where to go for gravel this year, due to a 2000-pit inventory completed by the state highway department's testing and research division, Engineering News-Record reports. Available to all users, the data include pit location and ownership; laboratory results on abrasion tests; and percentage content of non-durable materials.

WE HEAR

The bureau of employment security has said that a steady slackening "in the rate of new industrial layoffs" is indicated in recent sharp drops in new unemployment among workers. The bureau reported that sharp declines since mid-July have placed new applications for jobless payments at the lowest level since last November. Initial claims indicating new unemployment numbered 259,207 during the week ended August 20. This was a drop of 31,893 from the number filed the previous week.

* * * * *

The Massachusetts Public Works Department is urging the construction of a 90-mile toll highway through the state between Connecticut and New Hampshire. A commission study is planned to determine whether the project would be self-liquidating on the basis of traffic volume, and whether to proceed with the sale of revenue bond financing outside the state's credit to carry on the construction.

* * * * *

The nation's freight car fleet is expected to shrink slightly in the coming months, in spite of the fact that 280,960 new freight cars have been put on U.S. tracks in the last four years, American Association of Railroads reports. New cars are being installed by the railroads at the rate of 5000 a month "with likelihood of a further drop." Retirements of old cars are running at more than 6000 a month. It was also reported that in the 31 weeks ended August 6, loadings of hopper cars decreased by 10.4 percent from the like period last year, while the need for gondola cars was down 15.1 percent. However, an additional 8850 covered hopper cars were loaded, raising the use of covered hoppers by 4.2 percent from last year. This increase was due to heavy loadings of cement, chemicals and phosphate rock.

* * * * *

The West Virginia State Road Commission has leased a quarry site in Gilmer County, from which it expects to obtain some 100,000 cu. yd. of stone for use on secondary roads in the county. It has been estimated that it will furnish sufficient stone for construction of more than 60 miles of highway at the rate of 1800 cu. yd. per mile.

* * * * *

While road and street construction in the U.S. has been rising since World War II, the volume of work is still far below prewar levels, according to the 29th edition of Automobile Facts and Figures. Construction last year was 82 percent of the 1939 level, and only 55 percent of the volume averaged in the nation's peak road-building period of 1930-31. In dollars spent for construction, however, 1948 exceeded even the \$1.5 billion peak of 1930, and was far ahead of 1939's \$901 million.

* * * * *

Motor vehicle operators in the United States paid \$1,342,973,000 in taxes collected by the states on 30,646,486,000 gallons of motor fuel consumed in 1948, according to Public Roads Administration. This was an increase of 2,239,428,000 gallons, or about 8 percent, over the 28,407,058,000 gallons on which taxes were collected at prevailing rates in 1947.

* * * * *

Vandals caused an estimated \$800 damage recently at the United Sand & Gravel Co. plant, Canton, Ohio, when they ransacked the office, destroyed desks and then set fire to stacks of the firm's records in a nearby tipple. Three buildings of the Gurlea Sand & Gravel Co., Salem, Ohio, also were broken into, and robbed of equipment--a warning to other operators to keep proper locks and a close watch on their own places of business.

* * * * *

The first industrial research laboratory for large scale development of Mexican products has begun operation in Mexico City. Scientists and technicians for the Armour Research Foundation of the Illinois Institute of Technology are conducting laboratory tests and development on such projects as wax and oil extraction, matches, and fluorspar.

THE EDITORS



Daily Steel Deliveries to the Quarries and Mills

Wherever you are, Ryerson trucks are rolling your way every day . . . speeding shipments of the finest quality steel from nearby Ryerson stocks.

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here are 10 big reasons why the Dempster-Diggster can save you money

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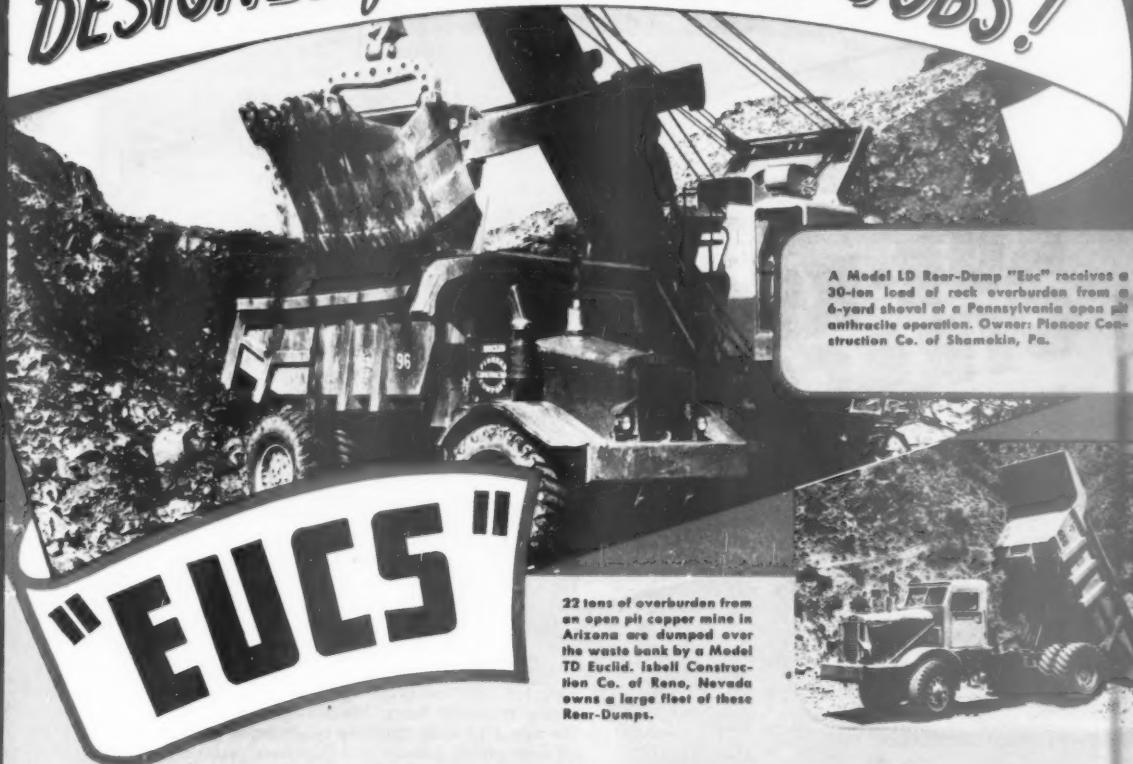
All control switches for the conveyors and screens are located on a roomy, elevated platform from which one operator can control practically the entire operation of the plant. Duplicate sets of belt conveyors are arranged to give the plant a conveying capacity close to 600 tons per hour. This plant rates high in convenient arrangement and ability to deliver large tonnages at low cost.

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A Model LD Rear-Dump "Euc" receives a 30-ton load of rock overburden from a 6-yard shovel at a Pennsylvania open pit anthracite operation. Owner: Pioneer Construction Co. of Shamokin, Pa.

22 tons of overburden from an open pit copper mine in Arizona are dumped over the waste bank by a Model TD Euclid. Isbell Construction Co. of Reno, Nevada owns a large fleet of these Rear-Dumps.



Assure HIGH PRODUCTION at LOW COST

Rear-Dump Euclids are built for long, efficient service in open pit mines and quarries and off-the-highway construction and industrial work. For moving rock, coal, ore, overburden, and other heavy excavation, Rear-Dump "Eucs" have the capacity and speed to haul bigger loads faster and at lower cost per ton or yard moved.

There are models for every hauling requirement...and body designs for all types of materials. Rear-Dump Euclids of 10 to 34-ton capacity are ruggedly constructed to withstand the impacts of loading heavy excavation and hauling over rough roads. Outstanding features include the Euclid planetary type drive axle for long life and continuous performance...sturdy body with smooth interior and flared rear chute...welded frame of tremendous strength...fast, double-acting hydraulic hoist...and loaded travel speeds up to 35.4 m.p.h.

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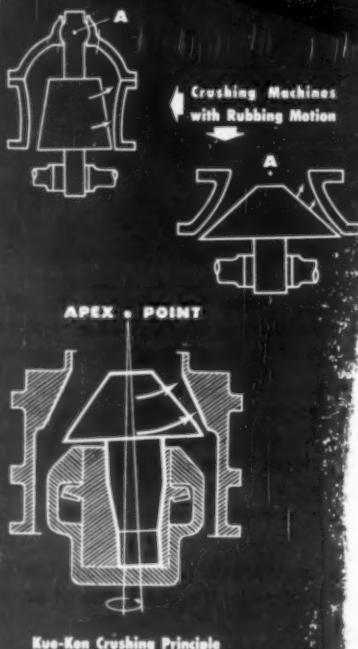
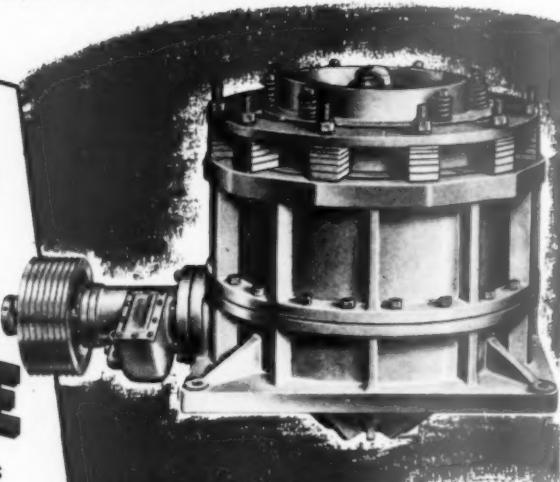


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Presents the

**KUE-KEN
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Less wear on Crushing Faces
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Kue-Ken Crushing Principle

Friction is the archenemy of Crushers. Slipping, rubbing and grinding consume excess power, wear costly crushing faces, lower capacity. But note how the new Kue-Ken crushing head, when gyrating about its apex point, follows arcs that pass *squarely* through the crushing zone. Rock is instantly gripped and crushed, not forced upwards. This is proper engineering —positive, efficient crushing by *pressure only*. Faster, finer crushing at *less cost per ton*.

The new Kue-Ken Gyracone is a rugged, compact, powerful Crusher that needs little headroom, fits easily into your flow sheet. Frame is cast steel. Giant shaft is 5 times stronger than in ordinary cone crushers. Lubrication is abundant and sealed. An automatic switch stops the Kue-Ken if oil pressure is below normal; an overload release guards against tramp iron. The Kue-Ken Gyracone can be choke fed and is quickly adjustable for different product sizes. For mine, quarry, and industrial operations.

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★ ★ ★ Editor's Page

Car-Cleaning Costs Reflect Substantially in Freight Rates

RAIL SHIPPERS of low-cost, heavy commodities like sand and gravel, crushed stone and all the other rock products have far more reason to complain about the high level of freight rates than most industries. Freight costs being such a large percentage of the delivered prices, every freight rate increase is being reflected in a proportionate decrease in profitable shipping radius.

Inroads of new competition, as a result, have become serious to established rail shippers and now the carriers themselves are really beginning to feel the effects of truck competition. Both industry and the railroads have a problem which requires cooperation between them.

A second sore spot among rail shippers is the condition of cars. The aggregates industries among others have been spending a fortune cleaning out cars in order better to serve their customers and to protect their products from contamination. That function rightfully is the responsibility of the carriers. Some of them are cooperating more in that respect than they were able to during the recent period of car shortages, through the operation of car-cleaning plants and other means. The railroads, of course, are trying to hold business and service is what they are trying to give.

Industry Penalized

Nevertheless, shippers are continuing the practice of cleaning out partly-unloaded cars, and those containing debris, on a scale so large that we doubt the seriousness of the problem is nearly appreciated. An aggregates producer in the Chicago area, for example, spent \$20,000 at one plant in 1948 just to clean out cars, at a cost ranging between seventy-five cents and two dollars per car. On a typical day recently, 31 of 51 open-top cars needed cleaning.

Some of these cars could have been side-tracked for cleaning by the railroad involved but the producer assumed the expense rather than keep his customers waiting an additional three to seven days for delivery.

What had to be cleaned out of these cars? Some had as much as fifteen tons of coke which a consignee paid for and didn't get. Others contained from one to four inch layers of coal or sand, two by fours and all manner of junk that had been tossed into them as the cars stood empty.

Such practice is costing millions of dollars annually. There is a great volume of goods never actually delivered to the consignee, so he loses. If the shipper cleans the cars, he is the loser, and a great volume of sales is required just to offset

the penalty which is serious, of course, where profits are measured in terms of cents.

When the carriers assume the responsibility for cleaning cars, the shipper has been relieved of direct expense but the problem has not been solved. It is just transferring the costs, and the shipper and the consignee still foot the bill. Cleaning cars on a railroad's cleaning track is one extra item of hidden operating cost that is reflected in the level of freight rates. The whole matter is a problem for the railroads but the shipper and consignee have a big stake.

One of the large midwestern railroads has revealed some cost figures to us which indicate that the condition of cars—those partly unloaded and littered with debris—has a decided bearing on shipping costs. This one railroad cleans out some 20,000 cars each month at a cost of approximately \$1.70 per car for the actual work. Total cost including switching, facilities and lost revenue days brings the total into several millions of dollars annually.

Impact on Railroads

When it is known that this carrier lost a little money while doing slightly over one hundred million dollar volume in six months, the importance of reducing the clean-out expense is apparent. Profits could have been made and even at a fairly substantial reduction in freight rates.

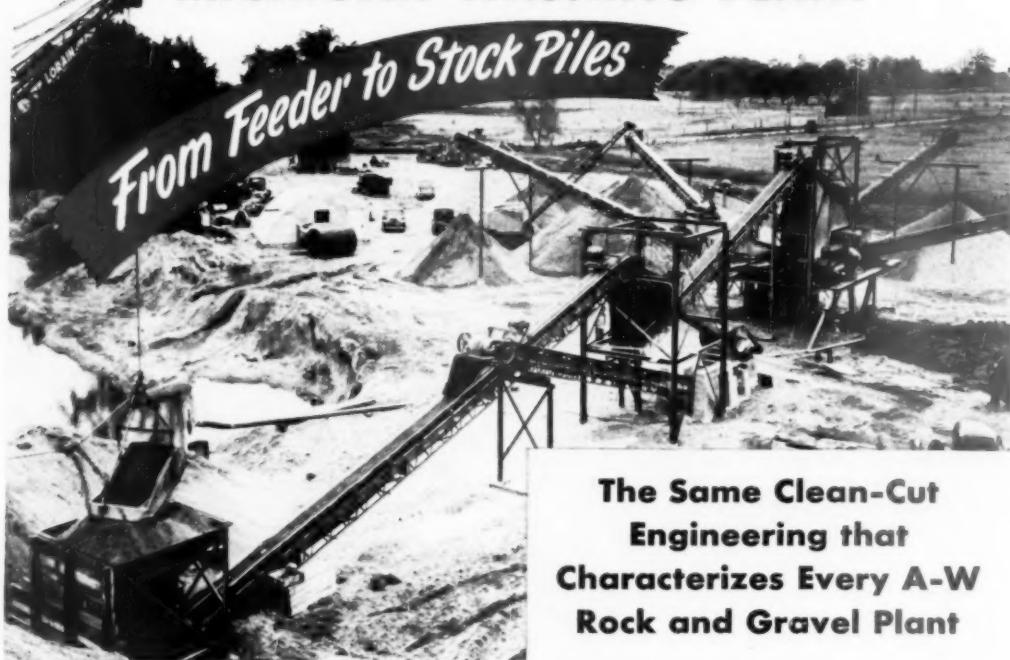
Institution of the forty hour week for non-operating employees now has raised railroad operating costs more than the increased rate recently authorized by the I.C.C., so the railroads may actually be forced to consider discontinuing the cleaning of cars in order to cut costs.

The consignee is to blame and all rail shippers should concentrate on educating him. Every rail shipper must impress on all his customers—in writing—the urgency of the problem. The shipper should hammer away at the necessity to unload cars completely and not fill empty cars with debris for disposal. That is being done by our Chicago-area producer, through letters and by stickers attached to each confirming order. Facts about losses in dollars and service are bringing results.

If this be done and followed through on a national scale, industry as well as carrier costs can be sharply reduced, and protection be built up against further freight rate increases.

Bron Nordby

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Rock and Gravel Plant**

Here is a complete gravel crushing, screening and washing plant for the production of aggregate for use in building or highway construction.

With the sizes of units used, total plant capacity is approximately 100 tons per hour. If desired, larger units could be used to increase production to 200 tons per hour, or more.

The plant has facilities which insure the production of properly washed and graded aggregate—a fine and a coarse sand, and two sizes of stone. If desired, additional sizes of product can be made.

Because of the simple arrangement, operating costs are held to a minimum. One man is all that is needed to operate the plant. A generator set provides power for the entire plant, including a water pump using about six gallons of fuel per hour.

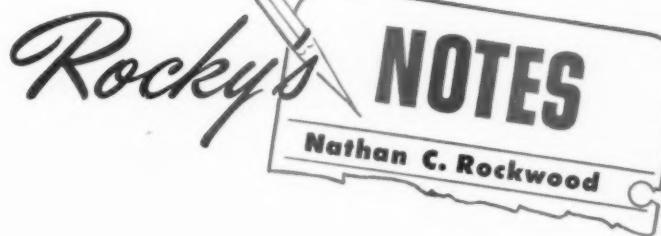
Two Eagle Fine Material Screw Washers, of the type shown in the accompanying photograph, operating in series, deliver the two sizes of clean graded sand. Similar washers, but without the flared lower end, are used for the stone, to insure the thorough scrubbing action which guarantees clean rock.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.



The enlarged and flared lower end of the tank provides the large settling area that is necessary to reclaim fine sand.

Austin Western



Case Against Labor Union Monopolies

WE HOPE that the United States Steel Corporation has available for general distribution plenty of copies of the statement, made by its finance committee chairman, Enders M. Voorhees, to the Presidential fact-finding steel board. It has been sent to the corporation's stockholders and presumably to the press. It should be read and studied by the owners and managers of every industry in the United States.

The Voorhees' "Statement" is a 70-pp. booklet. The following list of headings will provide an outline: (1) The Board's responsibility—not only to the President, but for the future economic health of the American people; (2) the struggle for power by labor union leaders, in their competition to rival or outdue John L. Lewis in his complete monopoly of one important branch of American industry; (3) the ultimate consequences; (4) about pensions — responsibility for pensions and the real cost; (5) the union's arguments, their fallacy exposed; (6) the accounts of the U. S. Steel Corporation analyzed as to where the money comes from and where it goes; (7) the "purchasing power" theory argument and what it really results in; (8) receipts and expenditures shown on a man-hour basis; (9) the "pot of gold"; (10) who shall be Peter, to pay Paul?

Pension Plan Solvency

Mr. Voorhees makes it crystal clear that a pension system of \$125 per month, which the union demanded, can not be paid out of hand. There must be an accumulation of funds or assets to take care of the past service cost and there must be current provision for future service cost. To pay pensions now of \$125 a month at retirement of employees 65 years old for all the members of the union, and to have the pension system financially sound, would mean that the corporation as of today would have to provide a fund, or set aside assets, of one billion dollars, which incidentally is equal approximately to the present market value of all the outstanding stock, common and preferred, of U. S. Steel. Worked out for industrial organizations of the entire country, in-

cluding yours, Dear Reader, this same pension scheme extended would impose a liability of more than their entire working capital of \$65 billion.

The Steel corporation has had a pension system in operation for many years, which pays an average amount of \$44 monthly, in addition to Social Security pensions. It costs the corporation \$42.5 million annually to include provision for the cost of future service from the fund thus being built up. If it were now to put aside an additional \$42.5 million it would take 35 years to catch up with a liability of one billion dollars. And, as is pointed out, all this adds up to more inflation, so that there is no likelihood that the union would long be satisfied with \$125 a month; in a few years it probably would demand twice that.

Purchasing Power Theory

The stock argument of labor union negotiators for another and another and another wage increase is always that the increased "purchasing power" of their members will head off another depression and unemployment. Mr. Voorhees explodes this argument thus: "I say this is quite fancy, because it flies in the face of common sense. What reason under the sun is there to suppose that if present employers are unwilling or unable to hire people at, say \$1.70 an hour, they will nevertheless hire more people if the cost is boosted to, say \$2.00, while simultaneously the profit from hiring them is reduced or turned into a loss? The union turns its own reasoning upside down with rapidity when talking about other things. It argues, for example, that more goods will be bought if prices are reduced; and, indeed, everybody knows that more can be purchased if the price is less, although the amounts by which volume is actually affected by changes in price widely vary among items according to their nature."

Mr. Voorhees says, farther on, "I am not quite sure just what the so-called 'purchasing power theory' behind the union's contention is. I have never been able to get anyone to define it precisely and in detail as something sensible. It may be that these are but appealing words to cloak a

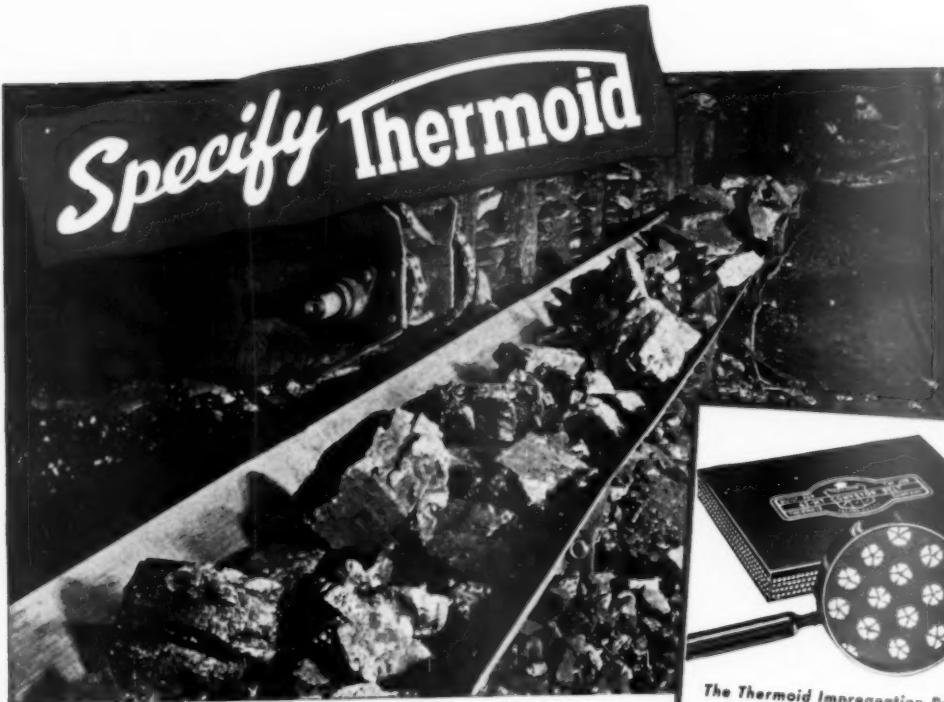
give-me-the-other-fellow's-money-to-spend idea." He then proves by sound argument, using the statistics of the Steel corporation, that this is meant.

Thus, the corporation employs directly about 300,000 people, but in addition through its purchases of products and services—and their suppliers in turn—the Steel corporation really employs 243,000 more. Again, in addition to these, the suppliers of new plants and equipment, which the Steel corporation spends some of its income for, with their suppliers in turn, accounts for another 43,000. The taxes which the corporation pays to local, state and federal governments, and their suppliers, provide funds for the payroll of 39,000 more employes. The corporation thus employs 300,000 directly and is responsible for the employment of 325,000 more, or 625,000 in all.

Intake and Outgo

Now then, the present direct labor cost of operating the Steel corporation is at present \$1.77 per man-hour. The gross income for the first six months of 1949 was at the rate of \$4.38 per man-hour. The indirect or concealed labor costs (for supplies, maintenance, etc.) was at the rate of \$1.69 per man-hour for short-term goods and \$0.26 for long-term goods (new plants and new equipment); for taxes of various kinds the cost was \$0.35 per man-hour. The bond holders and share owners got \$0.18, and the remaining \$0.18 on a man-hour basis was reinvested (to provide for future retooling, new plant, etc.). The union asked (including cost of its proposed pension plan) 30c a man-hour increase. From what items mentioned could that 30c be taken, assuming the same income? Moreover that 30c increase would automatically add 29c to the \$1.69 per man-hour for short-term goods (the same increase proportioned on the assumption that the union would ultimately achieve the same terms for all other producers) and 4c per man-hour for the long-term goods (wear and exhaustion cost). Thus the increase in man-hour cost to the Steel corporation would not be 30c per man-hour as the union would have the public believe, but 63c. This to be squeezed out of the \$4.38 per man-hour income! It is obvious, of course, that if all the profit, both dividends and reinvestment, were used there would still be a shortage which would have to come out of taxes now paid to government and from cutting down on concealed labor cost—by curtailing purchases, thus reducing the wages the suppliers pay.

The only possible answer is that such a 63c per man-hour cost increase would have to result in an increase in prices, which would probably reduce sales income, and/or "rob Peter to pay Paul"—increasing the wages of some steel workers at the expense of those thrown out of employment.



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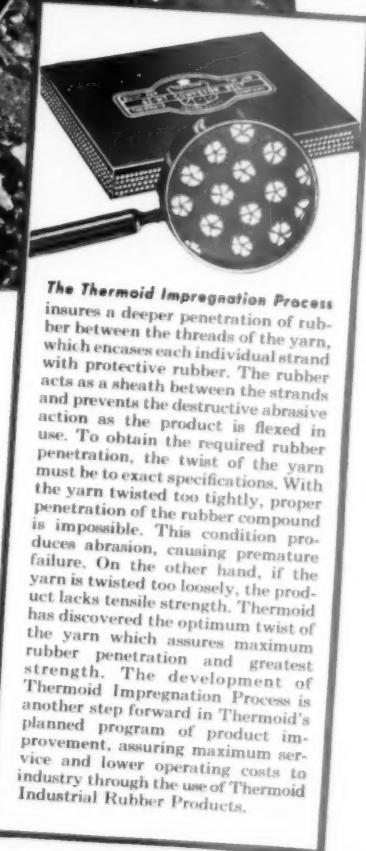
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LABOR RELATIONS TRENDS

Union Pension and Welfare Schemes

By NATHAN C. ROCKWOOD

THE REPORT of the Presidential fact-finding board for the steel industry is no victory for the employers. It opens the way for all unions in all industries to imitate John L. Lewis in demanding \$100 a month pensions for union members, nominally at the expense of employers, but actually of course paid for by all of us in the things and services we buy. The union undoubtedly asked for much more than it expected to get, for that is the set pattern in all such controversies. It triumphed in getting the board to recommend a liberal insurance and pension system—as an “obligation that should be among the first charges on revenue”—which it was estimated would add 2½ percent to the steel industry's operating costs. It is now up to the individual companies in the steel industry to bargain on this issue; if they refuse, they are guilty of an “unfair labor practice.”

The board said: “The details and specific benefits of the plans recommended should be determined through collective bargaining between each company and the union. The plans should be paid for by the employers without contribution by the employees, but should be limited in net cost to a maximum of about \$80 per year per employee, or 4¢ per hour on a basis of 2000 hours' work per year.” The union has asked for such things as death benefits, disability, accident, hospital and surgical payments. This with the 6¢ per hour or \$120 per employee per year for pensions adds up to an estimated overall cost to the employer of 10¢ per hour, or the 2½ percent increase in operating cost.

The social benefits that \$80 per annum per employee will buy, for the ordinary citizen at this time, are about those provided by the Blue Cross and the Blue Shield, now paid for in many industries by employees themselves. These cover part of the expense of hospital and surgical treatment, but provide no death benefits. However, many companies have some kind of such group insurance benefits, although they are usually contributed to by the employees and are on a voluntary basis. The Presidential board would thus give the unions the power to make them compulsory on the employer through a collective bargaining contract.

Far Reaching Issues

The board said: “Until the government begins to provide social insurance in adequate amounts and raises its old-age insurance benefits to amounts which will provide a minimum American standard, industry should step in to fill the gap.” The implications in

that statement are very far reaching. First, it implies that the government eventually will take over the whole scheme. Second, it implies that industry is not already providing the funds the government uses for present and future social benefits. Third, the overall implication is just what the few surviving believers in the American system of enterprise fear most—the welfare state, where everyone will be hookwinkled into thinking that they are relieved of individual responsibility for taking care of themselves or their dependents. It would have been far better for the economic health and welfare of the United States if the board had granted the 10¢ per hour increase and told the employees to use it to provide for their own future security.

There are many serious obstacles to individual employers contracting to pay pensions far into a future which no one can foresee—especially the smaller and more personalized the business. There are disadvantages for the employees as well as the employer. Naturally, any pension or other social benefit must be paid out of the income of an invested trust fund, or out of the current earnings of a business or an individual. It takes time and expert financial management to accumulate and maintain an adequate trust fund. The U. S. Steel Corporation does it, and has done it for many years by setting aside as a business expense, an annual sum, regardless of its income or profits. It is a fixed charge, the same as interest on indebtedness. But U. S. Steel is a giant industrial organization in a basic industry and probably as sound financially as the Federal government itself.

The coal industry is paying 20¢ per ton tribute (or we who buy coal, power, services or the things which require the use of power pay it), yet this private tax is not enough to maintain \$100 per month pensions for coal miners on a sound basis. John L. Lewis, in his bargaining with the coal operators next Spring, will undoubtedly ask for 30¢, 40¢ or even 50¢ per ton. In his capacity as dictator of the coal miners' union by cutting down coal production to a three-day-week output, Mr. Lewis is also cutting down the income to his pension trust fund, and is compelled to dig into the principal more and more. It is a good example of how production fluctuations must affect the income of any industry.

Other industries will have the same experience, if compelled to accept pension plans, for which adequate provision has not been and is not being

made out of past and current income. At the moment, probably, many individual industrial concerns can afford to pay pensions out of current earnings, which by and large are about the best ever, but what could happen to these same pensions if there were no profits over a considerable period? Did the board, in the short time allowed it, actually give its pension proposal adequate consideration? Or, is it merely doing its expected part to promote and hasten the coming of the welfare state; a term which Vice-President Barkley said recently was a compliment to the administration?

Cost of Pensions

In his “Statement” to the Presidential fact-finding board for the steel industry Enders M. Voorhees said: “Out of its own experience, U. S. Steel has learned that no pension plan should be undertaken, unless it can be financed on an actuarially sound basis, and is a plan to which the employee contributes substantially. Indeed, no one should have greater interest in or insistence upon actuarial soundness of a pension plan than the employee who looks to it for old-age benefits; and no one unwilling to contribute toward his own old-age requirements has a moral right to demand that others make that provision for him.”

“For U. S. Steel to adopt the union's pension plan, which is not in accord with well-tested practice developed from long experience of insurance companies in the pension field, would be basically unsound and unsafe for employees retired under such plan. We can not urge this too strongly. Is it fair to ask U. S. Steel to fly in the face of both its own experience and that of the insurance companies? Would this be protection of employees? Or would it be deception of employees?”

“It is a sad misfortune when pension plans have to be abandoned because of a lack of funds, or when expected pension benefits can only be partly made good. The union's plan definitely runs this risk. At such a time whom would the workers blame—the union leaders or the company?”

“Let me cite some examples of what pensions cost.

“Take John Smith. He is 40 years old the day the plan becomes effective, on which day he also starts to work for U. S. Steel. If he goes to an insurance company as an individual, he will be told that in order to get a \$125 pension at age 65 he must pay an annual premium of \$597.25 in each of the following 25 years. These amounts, with interest, would build up to \$19,870 by the time John Smith is 65 years old. This sum would provide for and be drawn upon to pay his pension.

“Take Bill Jones. He is 65 years old and retires from U. S. Steel the day after the plan becomes effective.

(Continued on page 120)

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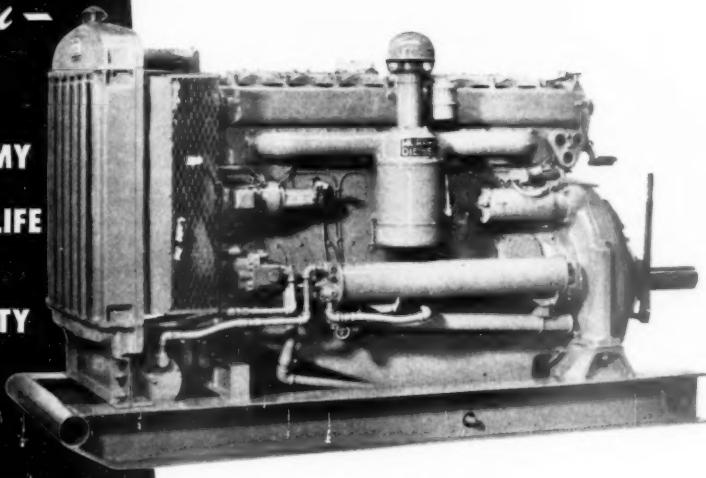
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the Personal Side of the news

Chief Engineer Retires

FRANK BAUMGARDNER, chief power engineer for Marquette Cement Manufacturing Co., Chicago, Ill., has retired after 38 years of service with



Frank Baumgardner

the company, but will be retained in a consulting capacity. A native of Ohio, Mr. Baumgardner joined Marquette in 1911 as assistant power engineer at the Oglesby, Ill., plant, and a few months later was promoted to chief power engineer. He worked closely with the design engineers in the research, design and installation of waste heat boilers at the plant. In 1924, when the plant at Cape Girardeau, Mo., was acquired, he was named over-all chief power engineer for the company. Prior to the purchase of the plant, he inspected the power generators and boilers and was responsible for all alterations. He also redesigned the production and power facilities at the Hawkeye Portland Cement Co., Des Moines, Iowa, when it was purchased in 1941. In 1935 he undertook extensive research into the manufacture of dry ice from kiln gases at the Cape Girardeau plant, which was successfully produced there for a time but later abandoned. Mr. and Mrs. Baumgardner are now vacationing in Canada, where they expect to remain until sometime in October.

Plant Manager Resigns

HERBERT H. LAUER has resigned as plant manager of the Glens Falls Portland Cement Co., Glens Falls, N. Y., to enter into private practice as a consulting engineer, with offices at Broad and Chestnut Sts., Philadelphia, Penn. He will be succeeded by BURT M. KEENE, assistant works manager. Mr. Lauer has had more than

30 years experience in cement and industrial plant design, construction and operation. He designed and had charge of construction of the Waco, Texas, plant of Universal Atlas Cement Co., and the San Juan, Puerto Rico, cement plant. He is a graduate of Lehigh University, Mining Engineering Course, and is a member of the American Society of Mechanical Engineers, and the American Institute of Mining and Metallurgical Engineers. He is also a registered professional engineer in New York and Pennsylvania.

Appointed Controller

BRYCE W. SIMPSON has been appointed controller of the Standard Gypsum Co. of California, Oakland, Calif., with headquarters at Oakland. C. W. ESHELMAN will replace him as office manager at Long Beach, Calif. Mr. Simpson joined the Kaiser organization in 1943 as an accountant and office manager at the Sunnyside, Utah, coal mine of the Kaiser Steel Corp. He became associated with Standard Gypsum in 1947. Mr. Eshelman was formerly employed by Western Pipe and Steel Co. and the Security National Bank of Southern California.

On Laboratory Staff

JAMES F. SHOOK, JR., has joined the staff of the laboratory of the National Ready Mixed Concrete Association, Washington, D. C. A news item about Mr. Shook's appointment appeared in the September issue of ROCK PRODUCTS, page 45.



James F. Shook, Jr.

N.R.M.C.A. Fellowship

W. G. MULLEN of Richmond, Va., has been appointed to the Stephen Stepanian Fellowship sponsored by the National Ready Mixed Concrete



W. G. Mullen

Association, Washington, D. C. A news item about Mr. Mullen's appointment appeared in the August issue of ROCK PRODUCTS, p. 93.

Receive Gifts

A. T. GOLDBECK, engineering director, and JOSEPH E. GRAY, field engineer, National Crushed Stone Association, Washington, D. C., have received full-grained leather traveling cases from students of the Third Short Course of the N.C.S.A. The cases were sent by A. N. Foley, general manager and superintendent of the West Roxbury Crushed Stone Co., West Roxbury, Mass., in behalf of the students.

Production Manager

CLARENCE N. EIDY, concrete block salesman for the Little Rock Lumber and Coal Co., Alma, Mich., has been appointed manager of concrete production. He succeeds Melvin Cruzen who has purchased an interest in a concrete products plant at Muncie, Ind. Bernard Engblom will be superintendent of concrete production at the plant.

Elected President

LESTER HELGESEN has been elected president of the Footville Lime and Rock Co., Footville, Wis. GUY CRAMER has been named vice-president and manager of operations, and W. A. CANARY, secretary and treasurer.

NEWS



Charles B. Baker



Fred T. Wiggins



George S. Neel

Universal Atlas Promotions

HENRY P. REID, chief engineer, Universal Atlas Cement Co., New York, N. Y., has been named vice-president of engineering. CHARLES B. BAKER, secretary, general attorney and director, has been appointed assistant to Blaine S. Smith, president, in addition to his other duties. FRED T. WIGGINS, formerly vice-president of sales, Western region, Chicago, Ill., has been promoted to vice-president and assistant general sales manager, with headquarters in New York. GEORGE S. NEEL, sales manager for Metropolitan Chicago territory, has been appointed Western sales manager, Chicago. He will be succeeded by Wendell R. Doolittle, Jr., who had been assistant sales manager, Chicago territory, since 1947. THOMAS E. BERTELSEN, formerly district sales manager, Indiana-Michigan district, will succeed Mr. Doolittle, and JOSEPH R. LAIR, sales representative in Porter and Lake Counties, Indiana, has been named to succeed Mr. Bertelsen as district sales manager.

Mr. Reid has been associated with the company for 25 years, serving as special engineer, operating engineer, assistant to the president, and chief engineer. In his engineering and research work, Mr. Reid has directed many developments in rotary kiln operations, fuel economy, rock and clinker grinding, dust control and collection. He is past chairman of the General Technical Committee of the Portland Cement Association and former chairman of the Manufacturing Research Committee. He was born in Tenement, N. J., attended public school and the New Jersey Military Academy, graduating from Cornell University in mechanical engineering in 1911.

Mr. Baker, new assistant to the president, joined the company in 1942 and became secretary and general at-

torney the following year. He was elected a director in 1944. Born in Kenilworth, Ill., Mr. Baker received his early education in Chicago and was graduated from Phillips Exeter, N. H., in 1931. He attended Dartmouth College and was graduated from the University of Chicago, A.B., 1936; J. D. cum laude, 1948.

Mr. Wiggins joined the company in 1926 at Birmingham, Ala., serving as clerk and chief clerk in the sales department until 1934, when he was appointed sales manager. In 1944, he became assistant to the vice-president of general sales in New York, and two years later was elected vice-president of sales, Western region, Chicago. He was born in Denmark, S. C., where he received his grade and high school education. He attended the Citadel at

Charleston, S. C., for two years before entering Duke University, where he received his A.B. degree in 1925.

Mr. Neel, western sales manager, Chicago, joined the company in 1919 and served in various sales management capacities in St. Louis, Kansas City and Des Moines. In 1939, he was appointed sales manager, Metropolitan Chicago territory. Born in Kamrar, Iowa, he attended high school in Des Moines and graduated from law school of Drake University.

Mr. Doolittle started working for Universal Atlas at its Buffington, Ind., plant in 1929 and later became sales representative in Wisconsin and then in Chicago. He received his preliminary schooling in Chicago and graduated from the University of Illinois.

Mr. Bertelsen, a native of Chicago, attended the University of Illinois and was employed as clerk at the South Works of Carnegie-Illinois Steel Corp. in 1928, before joining the sales department of Universal Atlas as clerk in the Chicago office in 1929. He became a salesman in the Metropolitan Chicago division in 1934.

Mr. Lair joined Universal Atlas in 1915 as a salesman in the Chicago office and has since served in sales capacities in various areas covered by the company's Indiana-Michigan district.

On United Nations Panel

A. J. DAWSON, chief marine engineer of Dravo Corp., Pittsburgh, Penn., has been appointed by United Nations Secretary General Trygve Lie, to the panel on navigation and flood control for inland rivers and canals. This is one of six major topics scheduled in the recent United Nations scientific conference on the conservation and utilization of natural resources.



Henry P. Reid

NEWS

Named Vice-President

MAX A. KOFFMAN has been appointed vice-president and treasurer of the Southwestern Portland Cement Co., Los Angeles, Calif. Mr. Koffman has been associated with the company since it was founded in 1907 and has served for many years as secretary-treasurer. T. K. PARTINGE, formerly general sales manager for Los Angeles, has been elected vice-president in charge of sales and traffic, and R. H. FIELDING has been promoted from assistant secretary to secretary.

Rotary Club Director

JAMES E. BATES, sales manager of the Federal Portland Cement Co., Inc., Buffalo, N. Y., has been elected to the board of directors of the Rotary Club of Buffalo.

OBITUARIES

CLARE H. BULLEN, treasurer and one of the oldest and most active members of the American Concrete Pipe Association, Chicago, Ill., passed away September 1. He was 76 years old. Born in Winfield, Kan., Mr. Bullen went to Yankton College, Yankton, S. D., and later to South Dakota State College, Brookings, S. D., graduating in 1898. He and his father founded the Portland Cement Products Co., Portland, Ore., in 1909, which expanded to 18 branches on the Pacific Coast. In 1926 Mr. Bullen sold his holdings on the West Coast, moved to Chicago and founded the Mid-West Concrete Pipe Co. He was president of the American Concrete Pipe Association in 1931-1932; director from

1924 to 1926 and 1933 to 1935; vice-president in 1942, and treasurer from 1944 to 1949. At the time of his death Mr. Bullen was making plans to attend the October meeting of the executive committee in California.

JESSE ROBY WRIGHT, plant manager of the Tennessee Bleaching Clay Co., Paris, Tenn., died suddenly on August 28, at the age of 50. He was also co-owner of J. R. Wright & Sons, lime-stone and gravel firm at Dover, Ill.

JOSEPH H. VONDER HAAR, president of the Vonder Haar Sand and Gravel Co., St. Louis, Mo., died August 19. He was 58 years old and had been in ill health for the past two years. Mr. Vonder Haar founded the sand and gravel firm in 1929 with his brother Al, who died in 1932.

CHESTER A. HOGENTOGLER, retired pioneer investigator in soil science of the Public Roads Administration, Washington, D. C., died recently at the age of 62. He had been with the P.R.A. for nearly 30 years and was head of its research in soil science from 1926 until shortly before his retirement in 1948. Mr. Hogentogler received the Bartlett Award of the American Road Builders' Association, American Association of State Highway Officials, and Highway Research Board, and the Dudley Award of the American Society for Testing Materials.

WELLINGTON P. HEWS, president and manager of the Yakima Cement Products Co., Yakima, Wash., died suddenly on August 17 as he was walking near his home. He was 69 years old. Born in Ashland, Me., Mr. Hewes, upon graduating from the University of Maine, joined the North Coast Railroad, a predecessor of the Union Pacific Railway in Washington, where he was in charge of marking and developing a line between Spokane and Yakima. He later became a timber surveyor for the B. R. Lewis Lumber Co., Coeur d'Alene, Idaho, and in 1909 worked on construction of the Wapato reclamation project. During World War I he saw service in France as a Captain in the Army Engineers Corps. He established a cement products company in 1920, and two years later he and John Sherman incorporated the present Yakima Cement Products Co.

ABRAM VAN AUKEN FELTEN, vice-president of the New England Lime Co., Adams, Mass., died August 17 at Westport, Conn. He was 83 years old.

WILLIAM ELLISTON FARRELL, founder and chairman of the Easton Car and Construction Co., Easton, Penn., died August 22 at the age of 79. Mr. Farrell was a pioneer in the field of industrial mechanized handling, and an international authority on the design and standardization of mine and industrial transportation equipment. He was born in Nashville, Tenn., and attended public schools there and the Webb Brothers School at Culleoka,



William Elliston Farrell

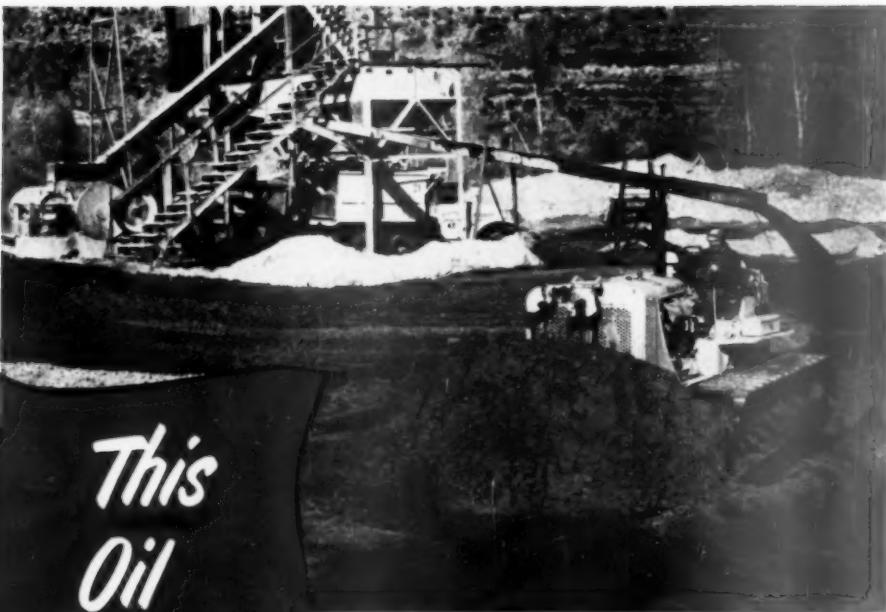
Tenn. At 17 he enrolled at Vanderbilt University, taking his post-graduate degree of mining engineer in 1891. After a tour of Europe with his professor of metallurgy and a term of teaching chemistry at Vanderbilt, Mr. Farrell got his first job as a blast furnace chemist for the North Branch Steel Co., Danville, Penn. Four years later he joined the Philadelphia Roll and Machine Co. and was appointed general manager in 1898. In 1900 he went to the Birdsboro Foundry and Machine Co., Birdsboro, Penn., as general manager. Five years later he joined the Treadwell Engineering Co. at Lebanon, serving as general manager and vice-president. He assisted in planning the new Treadwell plant at Easton, and went there as general manager and vice-president.

Mr. Farrell started in business for himself in 1912, as a manufacturers' representative in Easton. A year later he purchased the manufacturing business of Ernst Weiner and Co., and in 1914 incorporated this business as the Easton Car and Construction Co. He served as president until 1946, when he became chairman. Mr. Farrell was active in the study of quarry haulage problems and contributed much toward the development of improved transportation methods in mines and quarries. He patented the doorless two-way dumping pan (Phoenix Car) which is now used in many parts of the world. He also pioneered the use of trucks and trailers in open pit quarries. He helped to establish the Manufacturers Division of the National Crushed Stone Association and served as chairman. He is also a member of the Institute of Quarrying in England.

O. B. SANER, president of Oak Ridge Minerals, Inc., Rogers, Ark., passed away recently at his home in Kerrville, Texas. He was 55 years old and had been in ill health for the last two years. Mr. Saner was a native of Hope, Ark., but had spent most of his life in Texas.



Clare H. Bullen



*This
Oil
Assures
a Double
Saving*

When you put *Texaco Ursa Oil X*** in your heavy-duty gasoline or Diesel engines, it goes right to work removing any accumulated deposits of carbon, varnish and sludge from vital engine parts. Then, when engines are clean, *Texaco Ursa Oil X*** keeps them clean!

*Texaco Ursa Oil X*** is fully detergent and dispersive, and has exceptional resistance to oxidation. It keeps valves active and rings free, assuring full power from every gallon of fuel. It guards bearings against corrosion —

Texaco Ursa Oil X cleans as it lubricates . . . reduces both fuel consumption and maintenance costs**

makes all parts last longer. Thus, you save on fuel — save on maintenance.

For more efficient and economical operation of hydraulic mechanisms, use *Texaco Regal Oils (R & O)* as hydraulic mediums. They guard against formation of sludge and rust, prolong pump life, assure smoother operation and less time-out for servicing.

Use Texaco Products and the Texaco Simplified Lubrication Plan to cut costs on all your jobs. A Texaco Lubrication Engineer will gladly help you. Call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO Lubricants and Fuels



INDUSTRY news

Reopens Cement Distribution Plant

PERMANENTE CEMENT CO., Oakland, Calif., has placed its Duwamish plant in full operation, with Pacific Northwest headquarters shifting to that location, company officials have announced. During the past 18 months, the \$750,000 installation had been used only on a standby basis for cement storage. The plant, built in 1946, includes a packhouse with capacity of 40,320 sacks per day, 80,000-bbl. capacity bulk storage silos, spur tracks, car port for servicing truck shipments and a pier to serve bulk cement carriers.

Coincident with the reopening of the Duwamish distribution plant, addition of the steamer Santacruzement to the firm's fleet of bulk cement carrying ships has been announced. The vessel is one of two self-loading bulk cement cargo ships on the Pacific Coast, the other being Permanente Silverbow, also operated by the company. Santacruzement has a cargo capacity of 40,000 bbl. of bulk cement. Its cargo-handling system forces the cement, by air pressure, from the holds into shore side silos in less than 24 hrs.

Slag Processing Plant

BUFFALO SLAG CO. INC. is erecting a \$500,000 slag-processing plant on Bethlehem Steel Co. property in Lackawanna, N. Y., it has been announced, with completion scheduled for April. Equipped to crush and screen blast furnace slag, the plant will have a productive capacity of 500 t.p.h., and will be operated in addition to the slag company's existing Lackawanna plant. To load material from slag pits to truck for delivery to the crushing plant a Harnischfeger 4-cu. yd. diesel-electric shovel is being used. Buffalo Slag Co. takes about 1,500,000 tons of slag a year from Buffalo area steel companies.

Fluorspar Concentrates

MAHONING MINING CO., Rosiclare, Ill., which started mining fluorspar at Jamestown, Colo., operating a 43-year-old mill that originally was used for gold mining, is now operating on an around-the-clock basis, six days a week, turning out fluorspar flotation concentrates. The mill, formerly the Wano gold mill, was refurbished in 1940 by H. M. Williamson & Son Mining Co., and sold by them in 1946 to its

present owners. It currently handles from 80 to 100 tons of fluorspar ore daily—the entire production of the three Williamson mines. Last year the mill product, an almost pure calcium fluoride, was valued at about \$1,000,000 on the market at \$45 a short ton. It was estimated that production for this year might hit about 20,000 tons of concentrate.

Rock Wool Firm Expands

TEX-ROCK INSULATION MANUFACTURING CO., Temple, Texas, has opened showrooms and a warehouse in Dallas, George W. Elliott, president, has announced. W. J. Briggle, Jr., will be in charge of the new branch. The Tex-Rock Co., founded 12 years ago, is said to be the first rock wool plant established in Texas. In addition to handling its own insulation, the company distributes related heating, cooling and insulation equipment, and installation and demonstration items.

New Asbestos Mine

JOHNS-MANVILLE CORP., Asbestos, Quebec, Canada, has started construction of five main mine buildings and services near Matheson, Ontario, where the firm will open its second asbestos mine in the Spring. The first mine is at Asbestos, and is not to be affected in any way by the new operation, according to George Foster, vice president of the firm. Quality of the Ontario mine fibre is reported as unusually good.

Magnesite Processing Kiln

BASIC REFRactories INC., Cleveland, Ohio, has completed plans for installation of a magnesite-processing kiln at its plant at Gabbs, Nev. The 380-ft. x 9½-ft. dia. kiln is expected to process enough material to meet all company demands west of the Mississippi River. Facilities are being expanded also to include the mining of magnesite as well as brucite at Gabbs fields.

Cement Price Raise

PENNSYLVANIA-DIXIE CEMENT CO., New York, N. Y., has raised the price of cement 10¢ per bbl., effective October 1. The advance applies only in the East, company officials stated. Other cement companies with plants in the northeastern region of the country are expected to follow the same action.

Cement Plant Authorized Near Palm Springs

CONTROVERSY over zoning restriction which would prevent Samuel A. Guiberson from constructing a \$15,000,000 cement plant at Whitewater, Calif., near Palm Springs, ended recently when Riverside County citizens voted approximately 4 to 1 in favor of an unrestricted industrial zone. Mr. Guiberson has announced that he plans to call soon for bids on construction of the plant.

New Talc Mill

INTERNATIONAL TALC CO., Gouverneur, N. Y., has made plans to construct a 200-ton mill at Hailesboro at a cost of approximately \$1,000,000, company officials have disclosed. The new structure will replace a mill destroyed by fire last year, and will be built on a site nearly adjacent to the present No. 6 mill. Capacity of the No. 6 mill is 180 tons daily. The new addition will step production up to nearly 400 tons daily.

Belgian Cement Plant Improvement Program

CIMENTERIES ET BRIQUETERIES REUNIES AT LIXHE, near Vise, Belgium, will construct a new cement plant there under approval of the Economic Cooperation Administration. The new operation, which will replace five obsolete plants, will have facilities for production of about one-tenth of the total cement producing capacity in Belgium. Two kilns, 475 ft. long and 11½ ft. in dia., and necessary auxiliary machinery, will be purchased in the United States.

Perlite Expansion Plant

CLEVELAND GYPSUM CO., Cleveland, Ohio, has started the manufacture of expanded perlite in a new \$100,000 plant in that city, according to Maurice B. Jewett, president and general manager of the concern. The product is being mixed with gypsum for sale as plaster aggregate under the name of Lite-Rock.

Bulk Phosphate Plant

RUHM PHOSPHATE & CHEMICAL CO., has opened a bulk plant at Latham, Ill., Glenn O. Rau, plant manager, has announced. Agricultural limestone, phosphate and commercial fertilizers will be handled.

NEWS

Peruvian Cement Plant

ACCORDING to a Supreme Resolution of October 7, 1948, a concession for the establishment of a portland cement plant in the Province of Pacasmayo, Department of La Libertad, was granted, *Mineral Trade Notes* reports. The concessionaire has been authorized to exploit the limestone and clay deposits of "Temblerada" in the district of Trinidad, Province of Cutumaza, as well as the clay deposits of San Jose, on the Pacasmayo-Chilete road, for as long as the plant is in operation.

Output of the new plant at the beginning will be 2000 bbl. per day, producing portland cement of the following grades: type A, or medium grade, for general construction purposes, including roads and streets; type B, low-heat, special for dams and similar works; type C, quick-hardening; and type D, sulfate resistant. Equipment was acquired from the United States and American technicians will go to Peru to install the plant and train Peruvian personnel.

Freight Rate "Discrimination"

COCHITI PUMICE CO. AND THE PUMICE AGGREGATE SALES CORP., both of Albuquerque, N. M., and the General Pumice Co., Santa Fe, N. M., have filed discriminatory freight charges with the Interstate Commerce Commission against 98 eastern and mid-west railroads. The complaint charges that the railroads show prejudice against the state of New Mexico and its commodities in the matter of freight rates.

Pavement Yardage

AWARDS of concrete pavement for the month of August and for the first eight months of 1949 have been announced by the Portland Cement Association as follows:

	Square Yards	Yards Awarded
	During	During First
	August, 1949	Months, 1949
Roads	2,854,000	18,927,917
Streets and Alleys	2,282,882	12,314,154
Airports	89,370	1,488,044
Total	5,224,249	33,302,115

Gypsum Literature Award

"MANUAL OF GYPSUM LATHING AND PLASTERING," a 37-page publication distributed by the Gypsum Association, was recently awarded a Certificate of Merit by a joint committee of the American Institute of Architects and Producers' Council in the first product literature competition sponsored by the latter groups. The publication was classed as literature "deemed to be of a character which represents an excellent example of promotional product literature, and, as such, deserving of commendation." The competition was instituted to

"raise the standards of advertising and the dissemination of useful data and information on materials and methods of use to the architectural profession." The gypsum publication gives a thorough treatment of the history, manufacture and development of gypsum plaster, its correct application, physical properties, fire resistive ratings, and plastering problems and their solutions.

Sand and Gravel Plant

PALMER CONSTRUCTION CO. AND GONZALES GRAVEL AND SAND CO. have opened a sand and gravel pit near Gonzales, Tenn.

"Comic" Book Tells Company Story

MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., has mailed to its employees a four-color comic book outlining the cost of, and returns from, the company's 1948 operations. The 16-page report to the employee supplements Marquette's 1948 report to stockholders, previously released. The purpose of the new report is to make financial statements easily understandable to the employee and present facts and figures, on a one-man basis, in a way that invites reading.

Coming Conventions

October 19-21, 1949—

National Industrial Sand Association, Semi-Annual Meeting, Greenbrier, White Sulphur Springs, W. Va.

October 20-21, 1949—

California Associated Concrete Pipe Manufacturers, Fall Meeting, Santa Barbara, Calif.

October 20-22, 1949—

National Lime Association Operating Division Meeting, Hotel Commodore Perry, Toledo, Ohio.

October 24-28, 1949—

37th National Safety Congress and Exposition, Chicago, Ill.

November 2-4, 1949—

Southeastern Concrete Pipe Association, Fall Meeting, Montgomery, Ala.

November 29-30, 1949—

National Slag Association, Annual Meeting, Netherland-Plaza Hotel, Cincinnati, Ohio.

January 17-19, 1950—

National Agricultural Limestone Association, Fifth Annual Convention, Hotel Statler, Washington, D. C.

January 19-20, 1950—

Wisconsin Concrete Products Association, 30th annual convention, Plankinton Hotel, Milwaukee, Wis.

Week of

January 22, 1950—

National Sand and Gravel Association, 34th Annual Convention and Exhibit, Stevens Hotel, Chicago, Ill.

Week of

January 22, 1950—

National Ready Mixed Concrete Association, 20th Annual Convention and Exhibit, Stevens Hotel, Chicago, Ill.

Week of

January 29, 1950—

National Crushed Stone Association, 33rd Annual Convention and Exhibit, Stevens Hotel, Chicago, Ill.

January 31—February 2, 1950—

Agricultural Limestone Institute, 5th Annual Convention, Stevens Hotel, Chicago, Ill.

February 23-25, 1950—

American Concrete Pipe Association, 42nd Annual Convention, Fairmont Hotel, San Francisco, Cal.

NEWS

Indian Cement Industry

HISTORY of the cement industry in India, written by Mahesh Chand of the Economics Department of Allahabad University, has been summarized by *Mineral Trade Notes*. Cement was first manufactured in Madras in 1904, and three cement plants existed in 1913. During World War I, their production increased from 1000 long tons to 84,000 long tons, while imports decreased.

At the end of the war, imports increased and more companies were started, seven of them during 1919-22. Although the consumption of cement increased, there was an oversupply due to imports and internal overproduction. Prices decreased and production fell much below the total plant capacity. Only 361,000 long tons were produced though the production capacity was about 451,000 long tons, and imports fell to 68,000 tons.

During the period 1925-30, imports were rather stable. Internal produc-

tion of cement increased, though at a decreasing rate. It stood at 564,000 tons in 1930. The use of cement also rose, from 429,000 tons in 1925 to 636,000 tons in 1929. The next year, consumption declined by about 4000 tons. Indian output was still below the productive capacity. In 1931 there was an economic depression that reduced the internal production of cement still below capacity. In 1936, plants were started by the Dalmia interests in various parts of the country which went into destructive competition with existing Associated Cement Co. interests in the country. Both groups have now compromised. In the meantime, however, production and consumption of cement in the country steadily increased during the period 1931-39. The 1938-39 imports totaled 21,000 tons, production was 1,512,000 tons, and consumption was 1,533,000 tons.

In 1940-41, India imported only 4300 tons of cement. In the same year, India even exported some cement to

Iraq, Ceylon and the Dutch East Indies. During World War II, productive capacity of the cement industry was 2,782,000 tons, though the annual production never exceeded 2,250,000 tons (1941-42). Since 1942, production has declined steadily.

Automatic Mine Hoist Speeds Potash Production

THE POTASH COMPANY OF AMERICA has installed a new mine hoist at its Carlsbad, N. M., operation to speed production of potash for fertilizer. Developed by General Electric Co., the hoist can raise and automatically dump 8 tons of potash ore per minute from 1150 ft. below ground. The hoist is driven by two 500-hp. G. E. motors and alternately dispatches two ore buckets down the 1150-ft. vertical shaft.

Membership Directory

NATIONAL CRUSHED STONE ASSOCIATION has announced that a pocket size directory of the members of the Manufacturers Division has been prepared and will be periodically kept up to date. This will enable member companies to determine whether or not a manufacturers' representative is identified with a member or non-member of the division. Copies of the new directory may be obtained from the association.

State Cement Plant Adds New Silos

SOUTH DAKOTA STATE CEMENT PLANT, Rapid City, has added ten new silos to its plant, more than doubling cement storage capacity. Construction on all phases of a \$1,500,000 job to expand present facilities recently got under way, and a new kiln and the storage facilities to double output, are scheduled to be completed early in 1950.

National Safety Congress

THE NATIONAL SAFETY CONGRESS AND EXPOSITION will be held October 24-28 in Chicago, Ill., at which time some 12,000 persons will be present for the 37th annual convention of the National Safety Council. Sessions on industrial safety will be held at the Stevens, Congress and Morrison hotels.

Quarry Opened

KITSON BROTHERS QUARRY, Cedar Hill, Mo., is reported to be in full production, furnishing agricultural limestone, road macadam and certain other rock products.

New Perlite Deposit

PERLITE DEPOSITS have been discovered near Magdalena, N. M. However, analyses of the quality and extent of the deposits have not been reported as yet.

Take Marquette for example...



ORIGINAL MARQUETTE PLANT

SITE:	Des Moines, Iowa
EMPLOYEES:	12
WAGES:	12¢ per hour
FUTURE:	Uncertain



3 PRODUCING PLANTS



TEAMWORK DID IT!

Americans teamed together can do almost anything. Take, for example, the Marquette team that has grown from one tiny plant and 12 employees to a far-reaching enterprise providing jobs for more than 1000 people.

First there are the people whose inventing savings enable Marquette to buy the tools needed for cement production—plants, mixers and the rest. They are the stockholders, and without them, there's no beginning.

Then there are the employers—men and women who see these tools efficiently for the production of Marquette Cement.

Labor organizations, too, are on the Marquette team. Always watchful over the welfare of their members, they recognize the importance of preserving America's priceless economic system.

And then there is the quarterback management, whose job it is to plan ahead with wisdom and foresight so that the Marquette team will go forward, strong and secure.

It takes teamwork to win.

Marquette Cement Manufacturing Company



Marquette Cement Manufacturing Co. inserted the above advertisement in Labor Day issues of newspapers serving the communities in which company plants are located: Des Moines, Iowa; Cape Girardeau, Mo.; Nashville, Memphis and Cowan, Tenn.; St. Louis, Mo.; and Oglesby, Ill.

The promotional piece appeared in either half or full page space

HINTS and HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Cinder Grinding

AT THE GENERAL SHALES PRODUCTS Co. plant at Kingsport, Tenn., cinders for block manufacture are secured locally and hauled to the company's



Cinder grinder with solid bottom

plant in specially-designed company-owned trucks as often the clinkers are quite hot. The clinkers, after cooling in the stockpile, are ground in the No. 482 American grinder with solid bottom shown in the illustration. The unit has two 3-ton millers and uses a 30-hp. motor. It is fed by an American No. 459 feeder and the operation is tied in with a Mosher electronic control so that if the motor has over a 10 percent overload on it, the feeder slows down. A Wiley crane, using a 3-cu.yd. Owens bucket, feeds the hopper. Crushed material is elevated to a 3-x 10-ft. New Holland screen and oversize is sent back to the millers. The grinder will produce enough material in 10 hours to make 24,000 standard block. The use of such a grinder stems from the company's experience with it in its clay brick operation where it is said to be working out very satisfactorily.

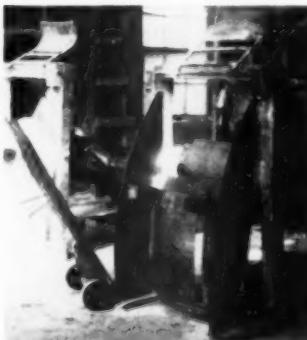
Painting for Warmth

AT A NEW PLANT where drying and tube milling of the final product is involved, the interior of the mill building was painted a battleship gray prior to starting operations. The men complained that the building was cold. The gray color did give it a cold appearance, so working on a hunch, the management painted motors, moving equipment, housings, etc., an apple green. This not only gave the interior a livelier appearance, and made it more pleasing to the eye, but had

a psychological effect in that the employees ceased to complain that the building was cold.

Lever System Loads Sacks to Hand Trucks

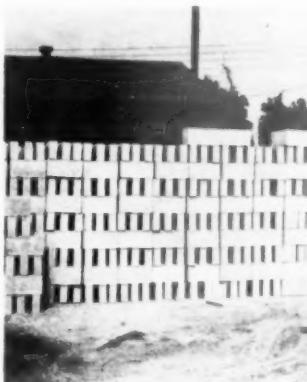
A LEVER resting on a spring is being used to load sacks to hand trucks at a plant in the Southeast where chicken grits are prepared. The materials are sacked in multi-walled paper bags which, when filled, pass to a short inclined conveyor that elevates them to a height slightly above the height of the hand trucks being used to haul the sacks to other sections of the plant. Without the use of the lever system illustrated here, the first sack to be loaded would fall the full height of the hand truck, perhaps breaking. As shown in the line drawing, the sack falls onto the end of the lever, which rests on a spring under the conveyor, and is counterbalanced. As the succeeding sacks fall onto the first one, this lever is depressed gradually until it rests at about floor level at which time the operator pulls the load onto his hand truck and takes it away.



Lever for loading sacks to hand truck

Air Curing of Block

OPERATORS of a concrete block plant in Florida believe that proper air curing and drying of a masonry unit is of special importance and look upon

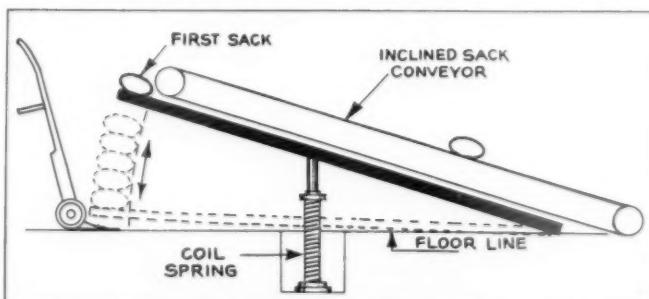


Block are piled so that ample air space surrounds each one

cubing block, or "just piling" them, with disfavor. It has been their experience, using a slag lightweight aggregate, that a better block results if the previously steam-cured units are piled outside and in such a manner that air can circulate all the way around the block. Consequently, they pile all units as shown in the illustration, leaving ample air space around each one. The block are made on one of the newer type Lith-O-block machines.

Ice-Free Batcher Gate

CENTRAL READY-MIXED CONCRETE Co., Iowa City, Iowa, prevents freezing of the discharge gate under its weigh batcher by coiling a copper



Details of lever system which prevents breakage when loading sacks to hand trucks

HINTS AND HELPS



Copper tubing steam line keeps discharge gate free of ice in cold weather

tubing steam line around the gate. Aggregates that normally contain about 2 percent moisture are increased to 4 percent moisture content in cold weather by the introduction of live steam into the aggregate bins for heating purposes. This water tends to collect around the discharge gate and would freeze if not prevented by the steam line. The copper tubing is connected to a 3-in. steam line that carries steam to jets in the aggregate hoppers.

Tractor-Mounted Roller for Handling Pipe

ILLINOIS-WISCONSIN CONCRETE PIPE Co., Chicago, Ill., employs a 4-ft. steel free-running roller mounted on the front of an International T-6 crawler-type tractor as an aid in stockpiling large concrete pipe. When the tractor attachment is brought into contact with pipe laying sidewise, the pipe is



Crawler-type tractor, with free-running roller mounted on front, pushing 6-ft. section of pipe

easily rolled into position. The roller is mounted on ball bearings and turns freely as the pipe rolls. According to the management, a tight stockpile can be built easily in this manner without the danger of chipping pipe as sometimes is the case when they are being positioned by crane or other methods.

Pallet Handling

PALLET HANDLING at a concrete block plant near Jacksonville, Fla., operated by Joseph M. Ripley, is made simpler through the use of small hollow steel rectangular boxes open at two ends. After cured block are hauled to the cubing yard, the cleaned pallets are stacked on the boxes. As a Tow-motor fork truck is used to deliver the stacks of pallets to the rear of a Besser block machine, the hollow boxes enable the forks to get under the load by being placed through the box. The

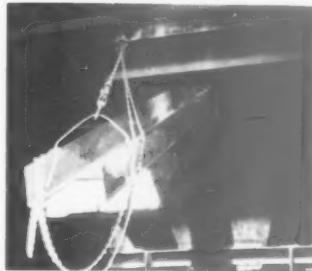


Pallets are delivered to roller conveyor at rear of block machine

holder and its load are placed on a short roller conveyor so that as one stack of pallets is used the next can be easily moved to a convenient point behind the machine where the attendant coats them with water-soluble oil before they are used.

One Mixer for Several Products

MANY concrete block manufacturers also produce such incidental items as highway marker posts, stair steps, lintels, etc. Some of the larger plants use a separate mixer for these products, but one operator in the South has a chute built from the steel hopper that serves one of his two Besser super vibrapacs, and concrete for incidental products is sent via this chute to a steel box approximately

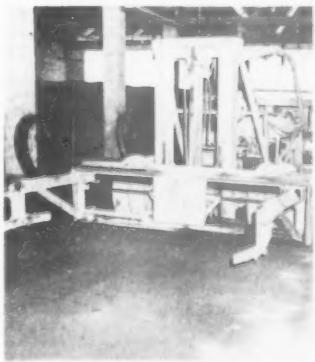


Concrete is taken via the chute, above, from hopper serving block machine, and delivered to box, below, for transport by lift truck to pouring section

24-in. high, 30 in. wide and 6 ft. long. One of the Clark fork lift trucks then takes the loaded box to the pouring floor. The box has a vertical slide gate on one side, about midway of its length, which gives an 8 x 14-in. opening, and the box can be tipped by the lift truck to aid in emptying it.

Handling Steel Forms

AT A CONCRETE BLOCK PLANT in the Southeast, a piece of equipment called a "jitterbug" is being used to handle the steel form for the Universal pipe machine (tamper). The jitterbug has claw-like arms that can be narrowed or widened and lifted vertically and which can pick up the empty or loaded form and move it about as desired. It is driven by a small Ford gasoline engine.

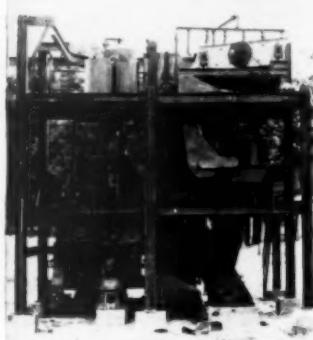


Machine for handling steel forms for pipe machine. Adjustable arms are opened at widest point in the photograph

New Machinery

Sink-Float Plant

THE SINK AND FLOAT CORP., New York, N. Y., has announced the Pre-fabricated Sink-Float Package plant, employing the Huntington, Heberlein



Prefabricated sink-float plant

(patented) process for accurately controlled heavy density concentration. The all-steel plants are available in sizes of 1000 to 15,000 tons monthly capacity, and are of bolted construction so that they may be erected quickly and dismantled with a minimum of delay. The plants include supporting structure, flooring, stairway chutes, launders, piping, etc.

Portable Self-Priming Centrifugal Pump

THE DEMING CO., Salem, Ohio, has developed a portable self-priming centrifugal pump to serve wide variety of drainage or water handling jobs where electric power or belting facil-



Self-priming centrifugal pump

ties are not available. The new unit is equipped with a 1½-hp., 4-cyl., air-cooled gasoline engine having a high tension magneto. The pump has cast iron casing, bronze impeller mounted directly on the engine shaft, and a mechanical type shaft seal said to eliminate need for stuffing box and packing gland. Pipe connections are 1½-in. suction and 1½-in. discharge. Performance ratings of the pump range from 10 g.p.m. with 80 ft. head to 90 g.p.m. with 15 ft. head.

Self-Propelled Arc Welder

HOBART BROTHERS CO., Troy, Ohio, has developed a self-propelled arc welder designed as a mobile unit to make welded repairs quickly around quarries, gravel pits and other industries having extensive operations. Two models are being produced, the GR-301-M with a 300-ampere welder for light to heavy welding requirements, and the GR-401-M with a 400-



Self-propelled portable arc welder

ampere welder for medium to extra heavy welding requirements. Either unit can be furnished with 1 or 3 kw. auxiliary d.c. power for supplying lights and universal power tools. The Weldmobile is equipped to roll along its own power and make on-the-spot repairs with arc welding, oxy-acetylene welding and cutting, and power tools. A universal coupler is provided on the rear to permit towing of additional equipment.

Geared Motor

STERLING ELECTRIC MOTORS, INC., Los Angeles, Calif., has introduced a new improvement on its "Slo-Speed" geared motors. The new type geared motor is of "Klosd-Tite" construction for atmospheres containing non-explosive dusts, vapors, and injurious foreign materials. An external fan forces cooling blasts of air over the protecting case.

Totally enclosed, the new unit fea-

**ROCK
PRODUCTS**



Totally enclosed geared motor

tures labyrinth seals, heavy-duty ball bearings lubricated for life, and the Sterling Herringbone rotor, motor and gears in balanced design, the manufacturer states.

Hydraulic Tire Remover

GOODYEAR TIRE & RUBBER CO., Akron, Ohio, has announced a hydraulic tire remover for changing large earthmover tires. The tool, especially designed to facilitate the breaking loose of these giant tires' beads from the rims, will operate on any tapered bead rim of Goodyear design, the manufacturer states.

The equipment consists of a ram assembly 19 in. long, weighing 25 lb., together with a pump and hose which provide hydraulic pressure for operating, the latter two pieces weighing 16 lb. These work on both front and back side of the rim making it possible to loosen damaged tires from the rim so as to effect quick changes right on the job. Under actual test condi-



Hydraulic tire remover for loosening beads of giant earthmover tires

NEW MACHINERY

tions the tool has withstood 18,000 lb. pressure at one spot on the rim to break the tire bead loose, the firm reports.

Dual-Diesel Walking Dragline

PAGE ENGINEERING CO., Chicago, Ill., has announced the Model 625 dragline featuring an adjustable rigid safety connection between fixed and movable masts. Its purpose is to hold boom at various angles securely without depending upon the use of cables. The boom hoist cable is used only for raising and lowering the boom and also serves as an extra safety precaution.

This model has a 150-ft. boom with a 9-cu. yd. bucket. Its working weight is 725,000 lb. and the working radius, with a 30 deg. boom angle, is 150 ft. The dragline has a 6-ft. step with shoes measuring 26 ft. long. A Page 5-cylinder horizontal diesel engine is used for loading and hoisting and a Page 3-cylinder horizontal diesel drives the generator for the electric swinging mechanism.

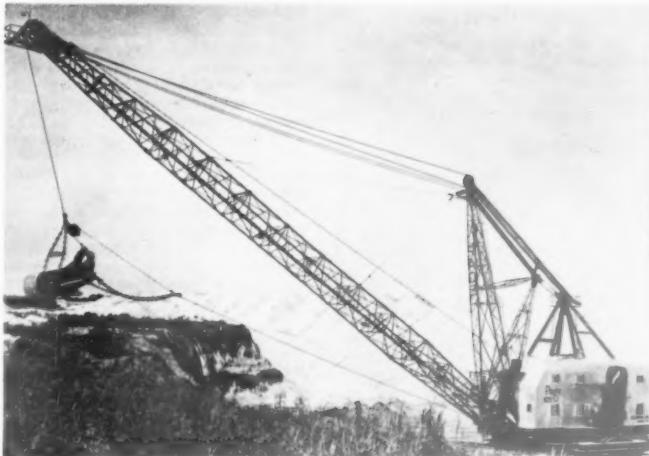
High Tonnage Classifier

THE DEISTER CONCENTRATOR CO., Fort Wayne, Ind., has developed the Concenco SuperSorter to meet the need for a multiple spigot, rising current classifier of sufficiently high capacity for economic handling of sand, phosphate rock and similar granular materials. The first industrial application, a battery of four 8-cell units has been in successful commercial operation for several months, classifying the feed to a large battery of coal washing tables, and these SuperSorters have proven themselves outstanding, capacity wise, and in efficiency of classification, the manufacturer states.

The all-steel cell unit construction, including top launder and 6-in. H-section supporting legs, stands 14 ft.



High tonnage classifier installation



Dual-diesel walking dragline with adjustable rigid safety connection between fixed and movable masts for holding boom at various angles securely without depending upon the use of cables

high. It is 6 ft. wide and accounts for approximately 5 ft. in the overall length of the machine. The 8-cell unit has a length of 40 ft. A feature of the classifier is the innovation for control of spigot discharge. Each classified spigot product is intermittently drawn off, with measured precision, from a quiescent bed at the bottom of the cell. The company points out that high capacity discharge of product is maintained with minimum water content and without disturbing the rising water currents or unbalancing classification in the sorting column immediately above. The constrictor valve mechanisms that control the draw-off from each cell are readily adjustable in operation over a wide operating range from open, 90 percent, to closed during 100 percent of each cycle. The valves permit a positively measured and uniform discharge rate from each cell. Only power required is for actuation of the tandem operated constrictor valve mechanisms. A 1- to 1½-hp. motor and gear reducer provides for this.

According to Don A. Weber, general manager of the company, the classifiers are expected to handle initial feeds up to 1½-in. in size in the sand and gravel and crushed stone industry, although those units currently employed in the sand and gravel industry are used mostly in classifying fine sands.

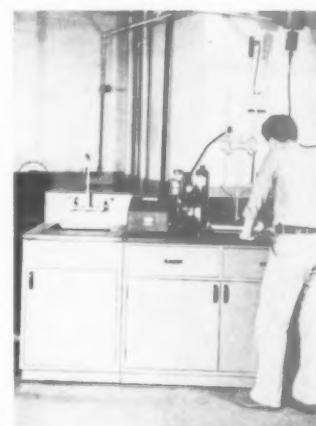
Dust Respirator

PULMOSAN SAFETY EQUIPMENT CORP., Brooklyn, N. Y., has announced the S-600 Dust Respirator which has official approval BM-2158 of the U. S. Bureau of Mines for Type "A" dusts. The unit features a Bureau of Mines approved 3-in. dia. silica dust filter; improved vision; adjustable aluminum body; black aluminum parts for re-

sistance to corrosion and light reflection; and double nylon elastic headbands which resist the effects of perspiration and acids, the firm states.

Prefabricated Test Benches

FISHER SCIENTIFIC CO., Pittsburgh, Penn., is now in production on a line of test benches for non-metallic ore plants. All-steel units, including drawers, cupboards, sinks, tables, storage cases, etc., are available in 18 different styles. These units may be joined together to give any desired length and style. Units come in heights of either 32 or 36 in. Tops are finished in Kemrock, a newly developed plastic-impregnated surface that is reported to be tough, smooth and extremely resistant to ovens and chemically corrosive materials.

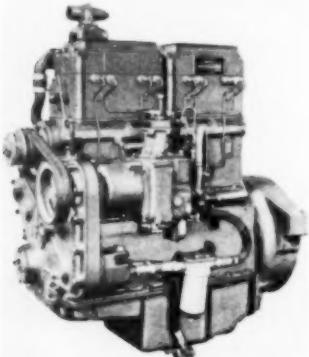


A two-unit test bench assembled from 18 styles offered by manufacturer

NEW MACHINERY

High Speed Diesel Engine

CUMMINS DIESEL ENGINE CO., INC., Columbus, Ind., has started the production of the model HR-400, high speed 4-cylinder diesel engine with a



Four-cylinder diesel engine with maximum rated horsepower of 110 at 1800 r.p.m.

maximum rated horsepower of 110 at 1800 r.p.m. The new unit has a 5 $\frac{1}{2}$ -in. bore and a 6-in. stroke, and a piston displacement of 495 cu. in. It is a four-cycle engine, and is equipped with standard two-valve heads, new increased flow lubricating system, continuous groove main bearings, standard HR liners and head gaskets, the manufacturer states.

Medium-weight Jackhammer

INGERSOLL-RAND CO., Phillipsburg, N. Y., has introduced a medium-weight jackhammer carrying the name, J-40 Jackhammers, which is similar in design to the heavier J-50 model and contains many of the same features.



Jackhammer with double-kicker port valve

The unit is capable of drilling in any kind of rock, the manufacturer states. A double-kicker port valve permits full air pressure on the piston for a longer period of time, giving more powerful blows and much stronger rotation. A specially designed auxiliary port allows full line air pressure to pass through the drill steel when the blower valve is opened, giving a strong blowing action which quickly cleans even deep holes of cutting. Another feature listed by the company is a three-in-one back head to enable the machine to be adjusted quickly for wet, dry or blower-type drilling. The unit was designed especially for use with Carset jackbits.

Swivel Connectors

THE CLEVELAND VIBRATOR CO., Cleveland, Ohio, is manufacturing a new line of air-tight swivel connectors designed for use with all types of compressed air-operated tools. The connectors provide a full 360-deg. swivel action which, it is said, increases operator efficiency and eliminates wrist strain and cramped hands in handling

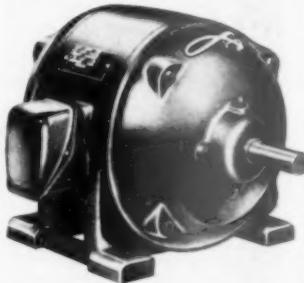


Swivel connectors for air-powered tools

air hammers, grinders, chippers, rammers, paving breakers, pneumatic wrenches, spray guns, etc., and eliminates kinking and buckling of air feed lines. Fabricated of rust-resistant steel, they can be furnished from stock in straight or "ell" types to fit hoses from $1\frac{1}{4}$ to 1-in. in size and pipe from $1\frac{1}{8}$ to 1-in. in size.

Single Phase Motor

LOUIS ALLIS CO., Milwaukee, Wis., is in production on a new line of integral horsepower, single phase motors, company officials have announced. Features pointed out include replacing, with a voltage relay, the standard centrifugal switch formerly used to disconnect the starting condensers from the line after the motor is up to speed. This relay is mounted in the control cabinet furnished with the motor. The control cabinet also contains an across-the-line starter and the necessary capacitors to make possible the removal of the capacitor en-



Integral horsepower, single phase motor

closure on the motor itself.

The new motors are built in capacitor start-induction run types in ratings of 1.5 hp., and in capacitor start-capacitor run types in ratings of 2, 3, 5, 7.5 and 10 hp. The capacitor run types are supplied with oil-type running capacitors which also are mounted in the control cabinet. The new line is available in open drip proof; splash proof; totally enclosed; fan cooled; and explosion proof construction.

Lightweight Headrest Spectacles

GENERAL SCIENTIFIC EQUIPMENT CO., Philadelphia, Penn., now offers a lightweight headrest spectacle designed for light welding, cutting and brazing. All plastic in design, the headrest distributes the weight evenly over the entire head, thus relieving the usual pressure on the nose and face, it is claimed. The spectacles can be worn over prescription glasses and can be easily adjusted to head-size.



Lightweight plastic spectacle designed for light welding, brazing and cutting

NEW MACHINERY

Model of Large Dragline

MARION POWER SHOVEL CO., Marion, Ohio, exhibited a working-scale model of its Marion 7400 walking dragline at the recent Coal Show in Cleveland.

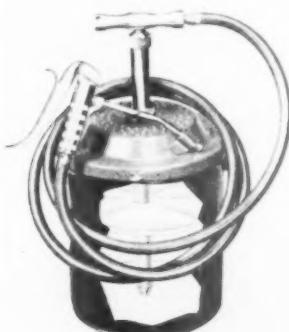


Working scale model of 12-cu. yd. capacity walking dragline

The machine after which the model is scaled is the second largest of three types of walking draglines manufactured by this company. The actual machine has a bucket capacity of from 8- to 12-cu. yd. and a boom length up to 200 ft. It is reported that this type of machine is finding wide application in the quarry, sand and gravel, and other non-metallic ore industries.

High Pressure Lubricator

KP MANUFACTURING CO., Minneapolis, Minn., has announced a one man, one hand operated lubricator, the E-Z Greaser, which has been designed for heavy industrial equipment and machinery, and for servicing automotive machinery. The design employed is said to make charging easy and increase the quantity of grease expelled per operation. The unit is equipped with an open well to hold the grease



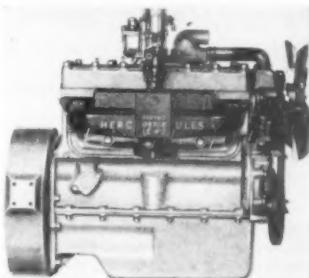
Hand operated lubricator

gun when it is not in operation, preventing the possibility of clogging the nozzle fitting. A push-squeeze handle enables the operator to develop pressure up to 7500 lb. without air or electricity. Hose lengths are available up to 15 ft., and the unit fits any standard 25 to 50 lb. original container. Another feature listed by the manufacturer is a follower plate to prevent channeling and pocketing of grease in colder temperatures.

Expands Line of Gasoline Engines

HERCULES MOTORS CORP., Canton, Ohio, has expanded its line of 2-, 4- and 6-cylinder high speed, heavy-duty gasoline engines with the addition of the "JX4" series of 4-cylinder models. These consist of "JX4E," with 3½-in. bore, 4½-in. stroke, and 164 cu. in. displacement; "JX4C" with 3¾-in. bore, 4½-in. stroke, and 188 cu. in. displacement; and Model "JX4D" with 4-in. bore, 4½-in. stroke, and 214 cu. in. displacement.

The engines are equipped with five main bearings and the crankshaft is



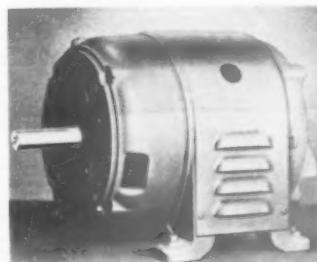
One of new line of gasoline engines

counterbalanced to assure smooth, vibrationless operation, and to reduce bearing loads. The crankshaft is hardened to permit the use of bearing metals of relatively hard and long service qualities. A positive oil seal at front and rear of the crankshaft is further protection against oil escaping at these bearing points. Main and connecting rod bearings are of the precision type.

Other features listed by the manufacturer are high turbulence design of combustion chambers, heavy duty pistons of alloy aluminum, exhaust valves with austenitic heads welded to hardened nickel steel stems, oversized oil pump of the gear type, full length water jackets around each cylinder, and a high capacity packless seal water pump.

Direct-Mounted Motors

U. S. ELECTRICAL MOTORS, INC., Los Angeles, Calif., has completed a new line of electric motors especially designed for direct connection to driven machinery. Designated as Unimount



Direct-mounted electric motor

motors, the new units are equipped with machined brackets to mount directly on almost any driven machine, with saving of space, neater machine appearance and compactness, the manufacturer states. Ratings are from $\frac{1}{2}$ to 500 hp.

Permanent Drum Type Magnetic Separator

DINGS MAGNETIC SEPARATOR CO., Milwaukee, Wis., has announced a new permanent drum-type, non-electric Alnico magnetic separator, complete with shaft and V-belt drive sheave, for automatic tramp iron removal. This magnet can be installed at the discharge end of chutes, spouts and conveyors for processing sand, powders, minerals, etc. Features listed by the manufacturer include: circumferential pole design for uniformity of magnetic field across the drum width; adjustable dual-purpose leveler and burden feed control. The non-magnetic wear-and-abrasion-resistant manganese alloy steel drum shell revolves on sealed, self-aligning ball bearings while the non-electric Alnico magnet inside the drum shell remains stationary. The non-magnetic material flows over the drum shell in a normal trajectory, the tramp iron holding fast to the drum by the magnetic pull, dropping off when it passes out of the magnetic field.



Permanent drum-type, non-electric magnetic separator

Agstone



Left: General view of plant showing fleet of spreader trucks and old quarry. New plant addition can be seen in background. Right: View of new quarry. A 1 1/2-cu. yd. shovel loads stone to truck which will carry the material direct to primary crusher.

Plant Designed Exclusively for Agstone

New plant of Maymead Lime Co., Shouns, Tenn., designed to facilitate maintenance and minimize vibration. Large fleet of spreader trucks operated in mountainous country

MAYMEAD LIME CO., Shouns, Tenn., which now delivers agricultural limestone to 15 counties throughout northeastern Tennessee, southern Virginia, and northwestern North Carolina, began operations in 1929 when W. B. Mount and his brother, J. B. Mount, came in control of approximately 1800 acres which are a part of an original 1781 land grant of 4000 acres from the state of North Carolina to the Mount family.

Realizing the value of limestone as a liming material, the brothers decided to extract and process for their

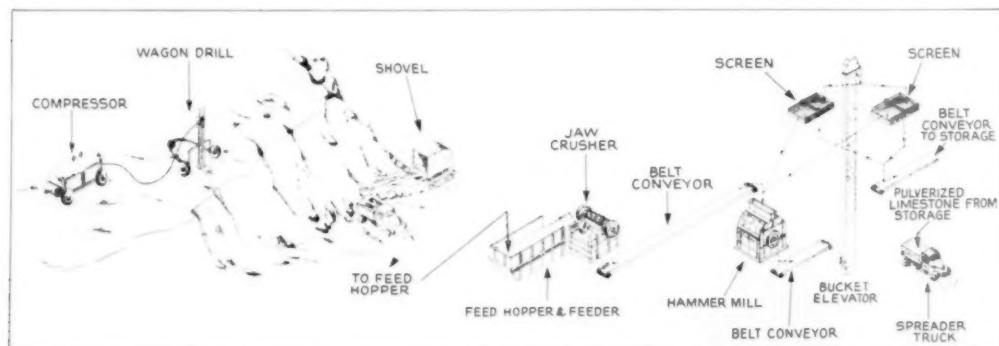
By W. R. CLIFFE*

own use limestone which existed on the property. They figured that their requirements would be in the neighborhood of 1700 tons annually and purchased a small mill with screens which was powered by a second-hand steam engine. From a mountainside directly behind the plant, the raw material was transported by wheelbarrow. Locally described as a disintegrated dolomitic limestone, the material is said to be noteworthy because

of its physical fineness with as much as 20 percent of the pit-run material passing a 10-mesh sieve. The stone averages 6.5 percent moisture. Under these crude conditions, they were able to produce approximately 5 tons of finished product per hr.

Impressed with the effect of liming upon the Mount property, land-owners in the vicinity began issuing requests to have trial patches limed. In those days the stone was spread by hand. As a result of the success of

*Consulting Engineer, Hershey, Penn.



Sketch of operations showing flow of material from quarry through plant to spreader trucks

AGSTONE

these trial patches, there was an increasing demand for the agricultural limestone being produced by the Mount brothers, and they formed the Maymead Lime Co. The increased demand meant larger facilities and a second and larger plant was built, this time powered by a farm tractor.

The firm claims to have made some of the first farm deliveries of agricultural limestone under government contract, and, under A.A.A., demands increased until sales reached 40,000 tons per year. In 1940, additions were made to provide capacity of 30 t.p.h. At the same time a fleet of trucks, equipped with Baughman self-unloading bodies, was bought. Through well-planned dispatching of large tractor-drawn quantities, a fleet of 24 spreader trucks was kept on the road the year round.

The original plant was located on the Southern Railroad. The railroad bed was later washed away in a flood and never rebuilt; consequently the idea of sending whole fleets of trucks together on long hauls to outlying areas was conceived. The roads were rugged, often reaching elevations in excess of 5000 ft.

Sales continued to increase and in 1947, faced with the need of greater capacity and confronted with a plant that was rapidly wearing out due to excessive demands, W. B. Mount called in a representative of L.I.M.E. Consulting Engineers, Hershey, Penn., to study the problem and submit recommendations for an entirely new plant.

Two quarries were studied, the first lying directly behind the plant, previously mentioned, and the second lying behind Mr. Mount's home. The latter quarry was opened about 1940



Transferring agricultural limestone from truck to half-track spreader for hillside spreading

and contains a deposit similar to that of the first quarry, except that the material is much less disintegrated and runs considerably lower in moisture content. Numerous samples taken from each of the quarries showed variations from high calcium limestone to true dolomite, and in all cases, the calcium carbonate equivalent ran well over the 80 and 85 percent minimums required by the states served.

The main consideration then was moisture, and it was finally decided that the second quarry would be worked except for those short periods during the year when the moisture in the first quarry runs only 1 to 1½ percent, even though the first quarry would have been more economical to operate from the standpoint of quarrying and transportation.

Drilling is done with an Ingersoll-Rand wagon drill which receives air

from a LeRoi portable compressor. Recovery is accomplished through a 1½-cu. yd. Unit shovel.

Generally, the roads tend to favor the load from either quarry, and it is expected that three 5-ton dump trucks will do the hauling year around from the farther quarry. The trucks dump directly onto the feeder for the primary crusher. To facilitate this, the skirts on the sides and the back plates on the feeder have been extended and flared to allow the storage of two to three truck loads of stone ahead of the primary.

An Austin-Western 24- x 36-in. jaw crusher reduces run-of-the-shovel rock to minus 4 in. The crusher is fed by an integral Austin-Western apron feeder. The primary crushing equipment is housed in a wood-framed structure, with access platforms and ample lateral head room to permit easy supervision and servicing of all crusher and feeder parts.

The new plant has been designed to take full advantage of the terrain, and as a result, no ramp is required for trucks dumping into the primary. Similarly, the slope on the 24-in. belt conveyor from the primary crusher to the pulverizer is kept at minimum.

Pulverizing is accomplished by a Gruendl 6 XD reversible pulverizer which is fed directly by the belt conveyor from the primary. A center feed reversible pulverizer was chosen because in all previous operations there had been extraordinary wear on the hammers, and maintenance costs for the hammers had been excessive. The pulverizer is supported on a steel frame having an independent foundation at the ground, and all chutes have been kept clear on the building framing. Consequently, there is no annoying or harmful vibration.

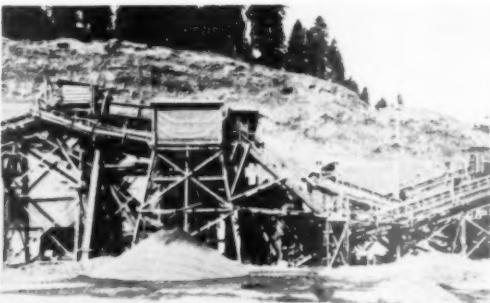
The discharge from the hammer mill is collected in a hopper and transferred to a bucket elevator by means of a short inclined 24-in. belt conveyor. The elevator is a centrifugal belt type and was supplied by the

(Continued on page 121)



New addition to plant showing primary crusher building in foreground, pulverizing and screening building in background, agricultural limestone storage building, right, and building and road stone bins, left

Aggregates



Left: General view of aggregates plant at Dorena Dam. Right: Closeup showing rotary scalper-scrubber, top. Small pile of material in foreground is part of the rejects from top section of 3 16-in. screen mounted under scrubber

Processing "Sub-Grade" Aggregates for Dorena Dam

Deficiency in sand sizes necessitates grinding mill to produce fines. Aggregate characterized by flinty chalcedony and slates of various hardnesses

DORENA DAM, now under construction near Cottage Grove, Ore., is in itself not a large project compared to such dams as Grand Coulee, Boulder, or Shasta dams. However, Dorena dam is of considerable interest, not only to the sand and gravel and ready-mixed concrete industries, but to the portland cement manufacturer as well for the story behind this interesting project may point to a way of supplying a corrective aggregate to sand and gravel materials that contain the so-called "reactive aggregates"—cherts, opaline rocks, chalcedony and similar hydrated silicas and this "corrective aggregate" may be the "reactive aggregate" itself.

Those who attended the Los Angeles meeting of the National Sand and Gravel Association in March of 1947, possibly will recall a very interesting paper delivered by Thomas E. Stanton, Mineral and Research Engineer for the California Division of Highways, on the subject of reactive aggregate. In his talk he mentioned that a low percentage of such materials as chalcedony, opaline rocks, etc., in the aggregate, when used with high alkali cements, would be very harmful to concrete, in most cases destroying the concrete through excessive expansion; whereas a larger percentage of these materials often was not detrimental. No elaboration was given particularly to this apparent contradiction. Later, through work done by the Bureau of

By WALTER B. LENHART

Reclamation at Denver, the Engineers Corps at Clinton, Miss., and other concrete research organizations this apparent contradiction was put to useful work, for in essence they found that if the harmful portions of

the aggregates were finely ground and this finely ground chalcedony, chert, opaline rocks, etc., was added to the green concrete the destructive expansion properties were corrected. As one engineer put it, "... adding 10 lb. of the finely ground chalcedony to the cement used, per. cu. yd. of concrete, caused the harmful reaction to take place instantly and before the con-



Loader reclaims sand that has been stockpiled for three days to drain, during which time change in F.M. takes place

crete had set . . ." We wish to point out, however, that this method of improving properties of concrete does not always work out as above indicated, and the subject is still in the development stages, and to stress the fact that reactive aggregates are only found to be harmful when used with the so-called high alkali cements. The cement used at Dorena is definitely not a high alkali material; however, if the findings of the research organizations working on the subject as above indicated are true, then Dorena practices could well be used to point the way to an over-all corrective for some concrete.

Dorena dam involves the placement of about 162,000 cu. yd. of concrete and some 4,000,000 cu. yd. of compacted dirt fill.

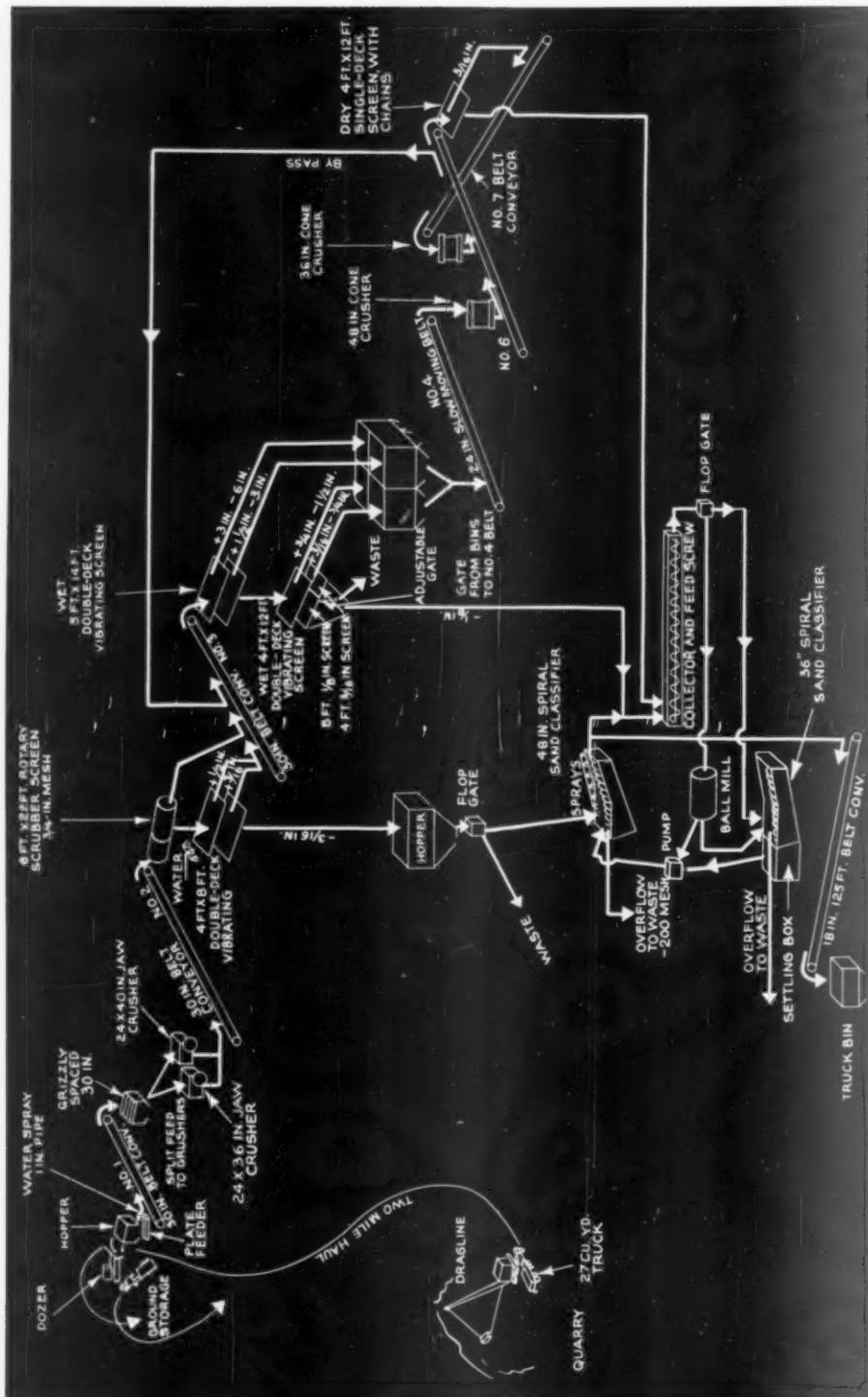
The aggregate for Dorena dam is supplied from a pit about two miles above the dam site. The area is close enough to the higher mountain sections to be subjected to flash floods caused by combinations of melting snow and high rain fall both coming at the same time. The periodic floods have washed down angular, sub-angular, and well rounded gravels the composition of which is highly complex and ranges from soft slates to hard and flinty cherts, agates, chalcedony and other rocks. There is a small amount of gold in the material but no attempt is made to recover it. Some authorities class the aggregate "sub-grade" as judged by conventional laboratory testing methods, but before any work was attempted at the dam site, the aggregate pit area was thoroughly tested. Large samples were sent to the Engineering Corps' research and testing laboratory at Clinton, Miss., and the aggregate was completely studied. The material was passed provided it was used with low alkali cement. The cement used is the Type "IV," low heat cement and is being supplied by the Oswego plant of the Oregon Portland Cement Co.

As an indication of how concrete from this cement develops compressive strength, with a 3-sack mix using 6-in. aggregate for the mass concrete, at 7 days a strength of 348 p.s.i. was indicated and at 90 days, 3078 p.s.i. In all the various types of concrete used at Dorena 4 to 5.5 ounces of Protex Vinsol (Autolene Lubricants Co.) air-entraining admixture is used. The admixture has here been found to be remarkably uniform and to give excellent and consistent results.

Elsewhere in this issue is published a separate article on the batching facilities at Dorena dam and more detailed information is given there on the concrete. At this point we wish to say that the concrete at Dorena is



Top: Tractor and dozer builds temporary stockpile between trips of the fleet of trucks. If a truck is delayed, this material is pushed to the primary feeder. Center: Dozer pushes pit run material to hopper over primary reciprocating feeder. Bottom: Truck dumping material to primary feeder

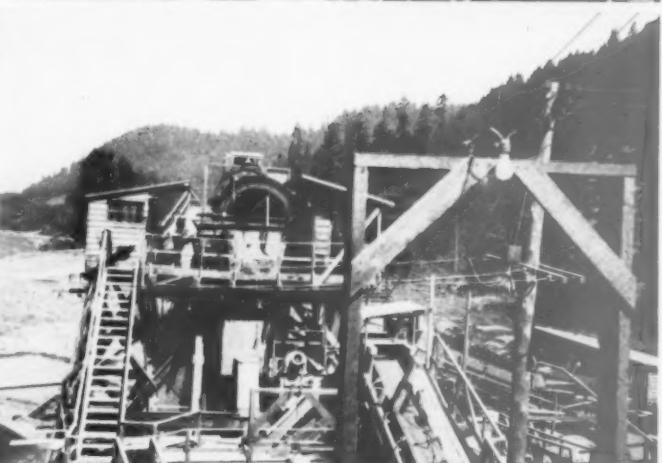
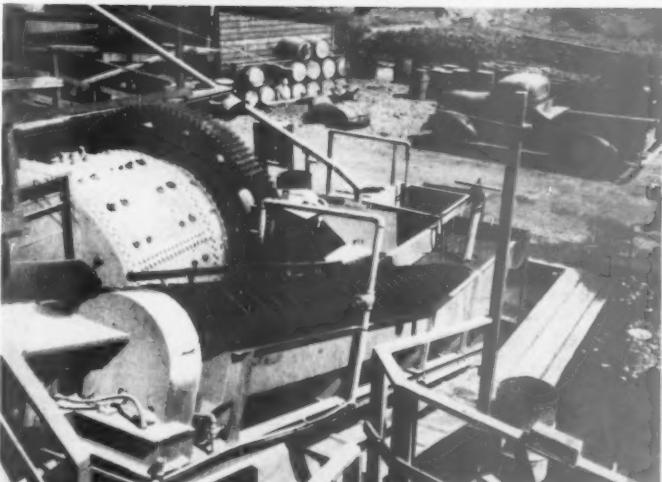
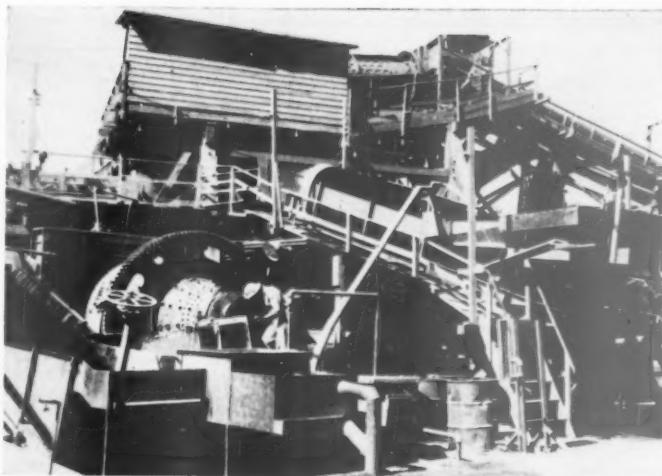


produced under close laboratory control, all the aggregate production facilities are constantly being checked by the laboratory staff, and the various materials being produced are checked and counter checked.

To sum up the Dorena project from the angle of aggregate correctives—if the finely ground hydrated silica rocks are a possible corrective, then it might be feasible for a sand and gravel producer who has such materials in his pit to install fine grinding equipment, grind the aggregate to sand size specifications and use this same sand with the coarser aggregate, the limiting factor being that sufficient minus 80-mesh (or thereabouts) material be in the sand; or, the reactive portion of the aggregate might be removed by such method as the sink-float process and this portion ground to minus 80 mesh and used as an admixture, or to be added to the concrete sand.

At Dorena the pit run material is deficient in sand, and the pit cannot supply enough sand to meet daily requirements. The sand in the pit also is deficient in the finer sizes, so to make up the difference, sand is "manufactured" by means of a standard Symons cone crusher, a short head Symons cone and a Hardinge ball mill. The details of how these three units operate in conjunction with Wemco sand machines and sand classifiers will be elaborated on later. The point to be made here is that in such a sand manufacturing set-up, the aggregate itself could be turned into its own corrective, for at Dorena, whether intentional or not, this additional safeguard to the resulting concrete is well indicated.

Dorena dam is located on the Row river which is one of the tributaries of the Willamette river. This project is part of the Willamette Valley Project which involves a total of 19 dams or "Multiple Purpose Reservoirs" because they operate in the interest of flood control, irrigation, navigation, power, fishlife, recreation, stream pollution and other uses. Two of the dams, Cottage Grove and Fern Ridge, were constructed before the war. Dorena, Meridian, and Detroit dams are under construction now. Eight of the dams will develop power and will add 381,900 kw. of installed capacity to the Northwest. The Dorena project was started in 1940 at which time highways, railroads and the water supply to Cottage Grove had to be changed. The war stopped the work, which was again resumed in 1945. The lake behind Dorena dam will store 79,000 acre-



Top: Operator places steel balls in ball mill through its discharge trunnion. The 36-in. sand machine is to its left. Center: Looking down the 36-in. sand machine which has sprays over its entire length. Ball mill is to left. Bottom: Discharge end of rotary scalper-scrubber can be seen at top of photograph, with a part of the screw conveyor, used in blending specification sand, in view under steps and below the scrubber

AGGREGATES

Mix Selector Number	Volume - Cu. Yd.	6 in. Mass		6 in. Face		3 in. Regular		1½ in. Regular		Grout	
		1	2	3	4	5	6	7	8	9	10
Coarse Agg.	6 in.-3 in.	Ib.	1871	935	1620	810	—	—	—	—	—
Coarse Agg.	3 in.-1½ in.	Ib.	1701	850	1570	785	1323	735	—	—	—
Coarse Agg.	1½ in.-¾ in.	Ib.	916	458	1080	540	1278	710	1984	1425	—
Coarse Agg.	¾ in.-No. 4	Ib.	853	427	1130	565	1530	850	1328	765	—
Fine Agg.	Sand	Ib.	1752	876	1480	740	1720	955	1656	995	1667
Cement	Type 4	Ib.	564	282	752	376	778	432	827	517	832
Air. Admix.	Protex Vinad	os.	4	2	8	4	7.7	4.6	8.8	5.5	—
Water		Ib.	380	190	374	187	423	235	416	260	440
Total Wt.		Ib.	8037	4018	8066	4003	7052	3917	6211	3962	2939
Slump		in.	1-2	1-2	2-3	2-3	2-3	2-3	2-4	10	10
W/C			.674	.674	.497	.544	.544	.503	.503	.529	.529

Basic concrete dry weight mixes. All weights of aggregate are dry weights. Compensation for moisture of all aggregate is by reducing weight of water

feet of water. No power will be developed here. The dam will be used mainly for flood control as the Row river has a rate of flow from a minimum of 15 c.f.s. to 28,000 c.f.s. The latter figure was obtained through a snow melt equivalent to 7 in. of rainfall which occurred during a rain of an additional 5 in. This amount of water had very destructive effects on the towns below.

Dorena dam is being constructed by Guy F. Atkinson Co., W. E. Kier Construction Co., Bressi & Bevanda Constructors, Inc., and A. Teichert & Son, Inc., and is under the supervision of the District Engineer for the Corps of Engineers, Portland, Ore., district.

Personnel for the Corps of Engineers at Dorena consists of: W. A. Schwarze, resident engineer; P. R. McCable, field laboratory control engineer, and N. J. Christensen, soil material division. The over-all supervision for the Northwest is under the direction of Colonel O. E. Walsh, Corps of Engineers, District Engineer. D. E. Polivka is in charge of the technical information branch for the engineers. Representing the contractors are A. H. Steiner, project manager for the prime contractor; Aubrey Horn, chief engineer; Verne Glasscock, materials engineer; James L. Brown, superintendent of aggregate production; Wm. Rives, batching plant and carpenter superintendent; and James R. Demos, batching plant foreman.

Similar to many of the construction projects under the direction of the Corps of Engineers, coarse aggregate is supplied in four sizes as follows: minus 6 in., plus 3 in.; minus 3 in., plus 1½ in.; minus 1½ in., plus ¾ in.; and minus ¾ in., plus 4 mesh. Specifications for the concrete sand are as follows:

Screen Size No.	Percent Passing
4	55-100
8	80-90
16	55-75
30	30-60
50	12-30
100	3.5-10
F.M.	2.40-2.90

By referring to the "Mechanical Analysis Graph of Granular Material" for the natural sand it will be seen how the pit run material could not

meet these specifications. This graph is not for an average condition but was a special sample taken as part of the daily plant routine check-up but it is close enough to illustrate the conditions at Dorena. The contractors faced with this type of sand asked various equipment manufacturers to design a plant on a guaranteed basis and to the Western-Knapp Engineering Co. of San Francisco fell the task of designing and building a sand processing plant as indicated. The firm's decision was to first install a 4-ft. Symons standard cone crusher and a 5 x 7-ft. Hardinge conical ball mill as the heart of the sand grinding section. Later a 36-in. short head cone crusher was installed between the two first mentioned units. For primary classification of the sand, a 48-in. Wemco spiral classifier is used. This is the Type S.H. high wier class with a flared tank and with a pool area of 68.5 sq. ft. The first sand machine is a 36-in. Wemco, Type S.H. and has a standard tank with a pool area of 35 sq. ft. and is augmented by a second 48-in. spiral sand machine that has a flared tank and a pool area of 112 sq. ft. The two sand machines are installed one on each side of the Hardinge mill.

To manufacture a specification sand it is probably more common

practice to blend two or three sand materials in amounts necessary to meet the requirements, but here the plant design was built around the idea of manufacturing the sand continuously, and to do this several adjustable gates and adjustable pockets had to be installed in the rather complicated sand circuit. The Hardinge mill was installed with the idea of operating it in a partially closed circuit with the two sand machines, but to date the ball mill operates in open circuit. The rather rigid specifications for sand are complicated by the fact that the pit run material has a clay content to be reckoned with that requires severe scrubbing and a relatively large amount of water throughout that section of the plant. Sprays of water are required through the full length of both the sand machines as shown in the illustrations so that a wet sand is delivered to the bin ahead of the ground storage facilities and even where the sand falls into that bin a spray of water is used to free it from the belt.

In addition to the spray of water here, a set of small, parallel "fingers" has been installed just over the belt and at the "point of throw" of the belt. These fingers tend to help free the sand from the belt, to mix it somewhat and help reduce segregation. The sand from this bin is trucked to a point near the plant and each day's production is piled in a separate pile. In all there are four piles here; one being built, one being drawn from and two draining. The foundation for the sand drainage area consists of a 6-ft. bed of cobbles (minus 6-in., plus 3-in.). Trucks deliver the material to the pile being built and the material is deposited in windrows that are later pushed into a higher pile by means of a Caterpillar tractor and dozer. After draining 72 hr. the sand is reclaimed by a Haiss loader and hauled to the batching plant near the dam where it is dumped to ground storage over a reclaiming belt.

The Haiss loader is powered by a Le Roi gas engine and this loading unit has found several uses around the operation. At one time it was called upon to reclaim 6-in. to 3-in. cobbles. During the drainage period a change in the sand takes place that reduces the F.M. about 0.20 so it is practice to keep the F.M. of the sands as delivered to the pile a little on the high side. Specifications require an F.M. of 2.40 to 2.90 and the material as delivered to the pile would have an F.M. around 2.80 as a typical example. During this drainage period, considerable fine clay drains out of the sand and is deposited in the upper zone of the cobble foundation, so periodically the "Cat" and dozer scrape off the top sand section and either discard it or return it to the plant.

The aggregate pit covers a considerable area and the material varies in depth from 6 to 15 ft. A small

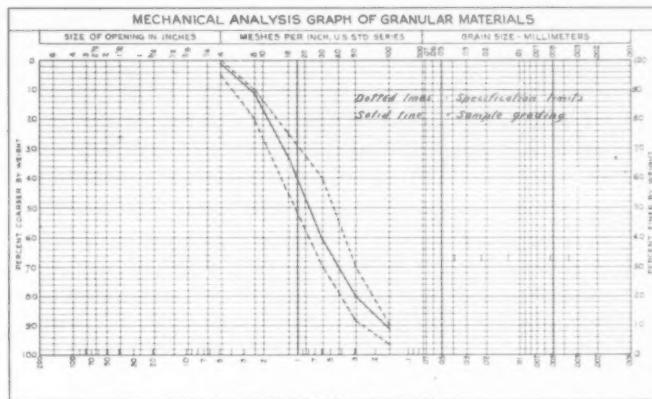
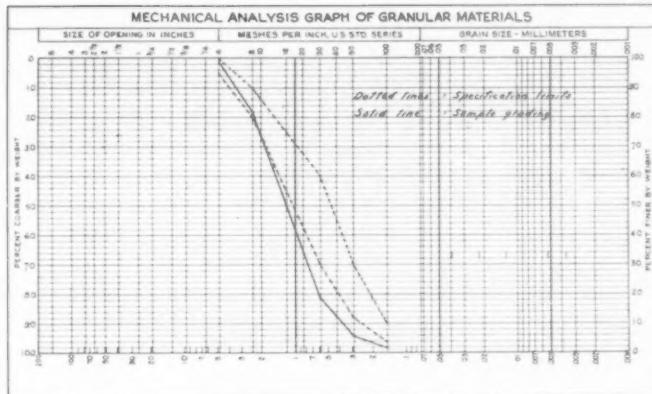


Dragline with 2-cu. yd. bucket loads to bottom dump haulage unit

AGGREGATES

amount of overburden is either pushed aside or sent to the dam to be used as a part of the earth fill structure. The laboratory designates areas that can be mined and these areas change from time to time as conditions dictate the need. A Northwest 80-D dragline using a 2-cu. yd. Electric Steel Foundry (Portland, Ore.) bucket loads to a fleet of four, Peterbilt, bottom-dump haulage units. The bodies of these haulage units hold 27 cu. yd. (struck measure) of material. The dumping mechanism is all cab-controlled through oil hydraulic cylinders so that no stoppage is needed to unload the bodies. Each truck is powered with a 200-hp. Cummins diesel. It requires an average of 18 min. to make a round trip with 5½ to 6 additional min. being required to load the haulage unit. The round trip haul is about 4 miles.

The trucks, on arriving at the plant, dump on the run and immediately a D-8 Caterpillar and dozer starts pushing the material into a hopper over the plant feeder. At times the trucks deliver more than the plant can handle so the "Cat" makes a temporary stockpile near the feeder and this material is later sent into the plant. Most of the material going to the plant is of relatively modest size so no grizzly is ahead of the reciprocating feeder serving the plant. The reciprocating feeder is a home-assembled, 36-in. x 6-ft. unit with a heavy 1¼-in. manganese steel plate mounted on heavy rollers. The discharge lip of the feeder has been made adjustable so that it can be raised or lowered by means of a small set of "Come-Alongs" so as to help adjust the feed rate. A 1-in. stream of water is played on the lip to wash the material off of it and onto the 30-in. inclined off-bearing belt. This water is readily absorbed by the mass on the belt. This No. 1 belt discharges to a 3-in. spaced grizzly with the oversize falling to one of two jaw crushers. One crusher is a 24- x 36-in. Diamond and the other a 25- by 40-in. Cedar Rapids. They operate in parallel. Each is driven by a 100-hp. motor. The gravel falling to these crushers can be regulated by a flop gate so that the feed can be split to each crusher in any desired proportion. Here again a small stream of water (1 in.) is applied to the aggregate to help wash it through the crushers. The crushers are set to deliver a product sized to meet the needs of the plant. For instance, one crusher can be set to deliver a 6-in. product and the other 3-in. or even smaller if the plant's output requires such regulations. This is the first of a series of regulatory devices in the plant. The two crushers deliver to Belt No. 2, a 30-in. inclined belt which serves a 6- x 22-ft. Allis-Chalmers rotary scrubber screen. The first half of this rotary unit is blanked off and used as a scrubber, the re-



Top: Natural sand from No. 1 classifier. Bottom: Final product, a blend of materials from No. 2 and No. 3 classifiers. Additional analyses are given on page 118.

maining half is provided with $\frac{3}{4}$ -in. perforated plate openings. The oversize from the end of the screen falls to Belt No. 3 which is a 30-in. inclined belt and delivers to a 5- by 14-ft., low head Allis-Chalmers, double-deck, wet vibrating screen. This belt is driven by a 40-hp. G.E. motor through a Pacific Western Gear Reduction unit. The top deck of the low head is 3-in. wire and the lower deck is $1\frac{1}{2}$ -in. wire. The cobbles from the top deck are spouted to wooden bins below and the minus 3-in., plus $1\frac{1}{2}$ -in. material is likewise spouted to a compartment below. The material through the lower deck flows to a 4- x 12-ft., wet Symons double-deck screen that has $\frac{3}{4}$ -in. wire on the top deck. The material on this deck is the minus $1\frac{1}{2}$ -in., plus $\frac{3}{4}$ -in. and it is spouted to its bin below. The lower deck of this Symons screen has 8 ft. of $\frac{1}{8}$ -in. wire on its upper section, and 4 ft. of $\frac{3}{16}$ -in. wire on the lower end section. Below this screen is a receiving hopper with another flipper gate so that all or a part of the coarser sand ($\frac{3}{16}$ -in.)

can be by-passed and wasted if desired. The remaining sands from the lower end of the screen are piped through a 12-in. pipe back to the ball mill section where they are received by the 12-in. screw conveyor that will be described later. This is the second regulatory device used as a part of the sand preparation scheme.

Returning now to the primary rotary scalper; the minus $\frac{3}{4}$ -in. material falls to a double-deck, Tyler wet vibrating screen mounted directly under the scrubber. This screen has a wear-taking, $1\frac{1}{2}$ -in. top deck and a $\frac{3}{16}$ -in. wire lower deck. The plus material from both decks passes to Belt No. 2 ahead of the low-head vibrating screen previously discussed. The minus $\frac{3}{16}$ -in. product falls to a receiving hopper that has another flop gate in it so that the coarser fractions (all or a part) can be discarded. This is the third regulatory device for sand manufacture. That portion that is not by-passed to waste falls to a 48-in. Wemco spiral sand classifier. The

Continued on page 118

Feldspar

FELDSPAR For GLASS MANUFACTURE

Pit-run feldspar is washed at new plant of Appalachian Minerals Co., Monticello, Ga. Magnetic separators effective in reducing iron content to meet glass-making standards

By WALTER B. LENHART



Loading minus-20 mesh glass feldspar to covered hopper car at Appalachian Minerals Co. plant, Monticello, Ga.

APPALACHIAN MINERALS Co. was incorporated in 1947, and during April of 1948 placed a new feldspar processing plant in operation. It is the only feldspar operation in Georgia and ships all of its products to neighboring states as there are no glass manufacturing plants in the state of Georgia. Operation of the Appalachian Minerals Co. is divided into two sections, each with its own plant. First, there is the washing and sorting plant at the Comer mine which is about 8.6 miles from the grinding plant. The washed feldspar is hauled to the new plant by trucks over gravel roads of easy

grades. This is said to be the only feldspar mine that washes the pit run material and for that reason the operation is quite unique. The second section of the company's operation is the drying, grinding and loading plant.

Feldspar occurs in the area as a weathered product from pegmatites. These pegmatites, in general structure, resemble a loaf of bread and are the higher portions of a gently rolling, and heavily wooded landscape. Prospecting for feldspar then resolves itself into first locating one of these elongated, dome-like structures. The

company has two mines in operation; the Comer mine that is nearer the drying plant and the Heard mine that is a few miles beyond the first named property. Crude ore from the Heard mine is trucked to the washing plant adjacent to the Comer. Both are open pit operations.

The Heard mine, larger of the two, is about 650 ft. long and 100 ft. wide and has been prospected to a depth of 30 ft. It yields a material of a slightly higher grade than at Comer. Drilling is done with jackhammers receiving air from a small rubber-mounted Jaeger compressor. A home-made box-



Left: Material at the Comer mine is recovered by a 1½-cu. yd. crescent scraper. Right: The ore is dragged to a grizzly and falls to a short inclined belt that delivers to a small rotary washing screen



FELDSPAR



General plant view. Pulverizing section features use of impactors, and 3-roll magnetic separators which reduce iron content to less than .08 percent

type, $\frac{1}{2}$ -cu. yd. hoe scraper delivers the broken pegmatite to a loading hopper. The hoe is powered by a company-assembled Jaeger two-drum hoist.

The material at the Comer mine is recovered by a $\frac{1}{2}$ -cu. yd. Sauerman crescent scraper which is powered by a hoist of the same make as at the Heard mine. The ore is dragged to a grizzly and falls to a short inclined belt that delivers to a small rotary washing screen. The fines are carried away by the wash water and men sort the coarser ore over a simple sorting table erected near the end of the rotary screen. Some mica is recovered by this hand sorting opera-

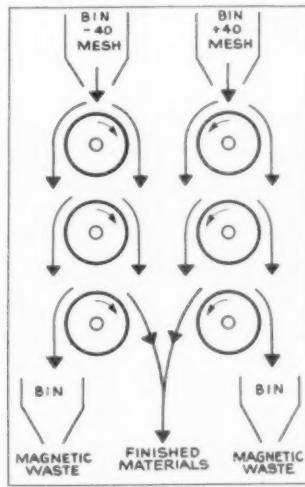
tion, mostly in the 1-in. to $1\frac{1}{2}$ -in. range. The pegmatite here is about 45 ft. wide and 400 ft. long. Trucks from the other mine dump their loads so that the drag scraper can move the material into the plant. The entire washing and sorting operation is very simple but effective. From the Comer mine about 25 to 30 percent of the pit material is recovered as saleable feldspar. At depth, the deposit is said to be of such grade that a considerably

higher recovery will be possible. The crude feldspar from the washer falls to a 20-cu. yd. Austin-Western bin from which the material is trucked to the drying and grinding plant. Water for washing is secured from a nearby creek by means of a 2-in. Gardner-Denver centrifugal pump. The Comer pit is kept dewatered by a 3- x $3\frac{1}{4}$ -in. gasoline-driven Jaeger pump. The rotary screen used at the washer has an outer and shorter jacket of $\frac{1}{2}$ -in. slotted wire. The inner barrel has $1\frac{1}{2}$ -in. round openings. The screen has an I.D. of 32 in. and is 9 ft. long. The dust jacket is 45 in. O.D. The plant handles 150 tons of feed per shift.

Trucks on arriving at the drying plant are first weighed on a pair of Fairbanks, Morse truck scales and the material is then dumped to one of six



Truck carrying crude feldspar from washer dumps material to open bins adjacent to primary crusher



Arrangement of magnetic separators operating in series



Oil burner mounted on 30-ft. x 54-in. dia. rotary dryer

FELDSPAR



B. C. Burgess, vice-president

stalls or bins adjacent to the primary crusher. These stalls are available so that different grades of crude material can be kept on hand. Four of the bins are covered but are so constructed that a truck can back into and over them to discharge its load. The other two bins are open. Each will hold several carloads of crude washed rock.

The crude rock is hand trammed to a plate feeder that serves a 15- x 24-in. Diamond jaw crusher set to deliver a 1½-in. product. A 14-in. inclined belt delivers the rock to a 54-in. dia. by 30-ft. oil-fired rotary dryer that uses a Size 3, Type AP 13, Ray oil burner. A bucket elevator delivers the dried feldspar to the top of the mill to a double-deck, dry W. S. Tyler Co., Hum-mer screen that has a 4-mesh top deck and a 20-mesh lower deck. The top deck is more of a wear-taker and the plus from both decks falls to a CF-5-32 Pennsylvania Crusher Co. impactor that is in closed circuit with the screen. The minus 20-mesh material falls to a 3- x 10-ft. dry single-deck,

W. S. Tyler Co. vibrating screen that acts as a splitter dividing the material into a plus 40 and a minus 40-mesh product. The two products fall to individual 5-ton surge bins ahead of the Dings magnetic separator. In this machine there are two vertical banks of three rolls each. The plus 40-mesh goes over one set of the three rolls and the minus 40-mesh goes over the other bank. These machines are very effective and reduce the iron content (Fe_2O_3) from 0.25 percent down to .08 percent and less. After passing through the magnetic separator the finished materials join and are elevated to three concrete silos from which the material is shipped in covered hopper cars or boxcars. The magnetic portion is wasted. The building is of frame construction and covered with a building paper that makes the



A. McCourry, mine foreman, left, and L. P. Wariner, president, Appalachian Minerals Co.

structure resemble a brick building. For a structure of this type it is very attractive.

The company maintains a laboratory at the plant and all materials shipped are subjected to thorough testing to insure that only materials of proper grade leave the plant.

The material is a microcline feldspar high in potassium. In the deposits small amounts of amazonite can occasionally be found, a rare, green-tinted feldspar. At present only a minus 20-mesh glass feldspar is shipped but the company is now constructing an addition to produce pottery feldspar. A Hardinge pebble mill and two more silos will be installed. The material will be shipped in sacks and in bulk. A typical analysis of the glass feldspar now being shipped is as follows:

SiO_2	69.0	percent
Al_2O_3	17.2	percent
Fe_2O_3	.08	percent
CaO	.30	percent
K_2O	11.70	percent
Na_2O	1.75	percent
	100.03	



Newland Buchanan, mill foreman

The plant is located on the rails of the Central of Georgia and about five miles south of Monticello, Ga. The offices of the company are at the plant. L. P. Wariner is president; B. C. Burgess, vice-president and general manager; A. McCourry, mine foreman; and Newland Buchanan, mill foreman. Mr. Wariner and Mr. Burgess presented a paper on the feldspar and mica occurrences at the October, 1948, meeting of the A.I.M.M.E. in St. Louis.

Maps of Western Mica Deposits Released

DIRECTOR W. E. WRATHER of the Geological Survey has announced release in open file of two folios containing 28 maps of mica deposits at various localities in Idaho and Montana. Geologic maps of the surface and underground workings of the Muscovite and Steelsmith mines are included in the folios. The Muscovite mine was the largest producer of sheet mica during the last period of major activity in sheet-mica mining. Maps of 20 other mica deposits also are included in the folios which may be inspected at Geological Survey offices in Washington, D. C. and Spokane, Wash.; at the University of Idaho, and at the State Bureau of Mines and Geology, Butte, Mont.

Explore Mica Deposit

REPORT OF INVESTIGATIONS 4507, "Investigation of Mica Deposits at the Victory Jack Rabbit, Rainbow, and Midas Mines, Custer County, S. D., has been announced by the Bureau of Mines. Successfully demonstrating the feasibility of diamond-drilling to determine the mica-potentiality of a pegmatite deposit, the Bureau drilled nine diamond drill holes totaling 1022.9 ft. on these Black Hills deposits between January and April, 1944. Subsequent mining in a number of cases verified the interpretations made from drill cores. Logs of drill holes and descriptions of each property are included in the illustrated report which may be obtained free from the Bureau Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Penn.

Beryl-Mica Deposits

RESULTS of wartime investigations of three beryl-mica deposits in Connecticut are described in Report of Investigations 4225, "Investigation of Portland Beryl-Mica District, Middlesex County, Conn." recently made available by the Bureau of Mines. The report contains a history and description of the properties, maps and geologic sections through drill holes, and condensed logs of diamond-drill holes. Free copies may be obtained from the Bureau Publications Section, 4800 Forbes St., Pittsburgh 13, Penn.

Producing Metallurgical Lime

Sheffield Steel Corp., Houston, Texas, produces lime at site of steel plant. New shaft kilns employ side and center burners with natural gas

By GORDON R. LACY*

STUDIES were made in 1947 by Sheffield Steel Corp., Houston, Tex., with respect to the feasibility of manufacturing its own burned lime requirements at the point of use—it's open hearth furnace department near Houston. Justification for such an installation was found and the use of vertical kilns fired with natural gas was decided upon. The Azbe Corp., St. Louis, Mo., was authorized to proceed with design of a complete plant, including two kilns of 40 t.p.d. capacity each.

Plant design begins at a track hopper where hopper-bottomed gondola cars, carrying raw limestone, are unloaded. From the track hopper, a 24-in. wide steel pan apron conveyor on 28-ft. 6-in. centers carries the stone up a slope and discharges over a stationary bar grizzly with 1½-in. clear openings, oversize going directly to the kiln charging car and undersize being chuted to a centrifugal discharge elevator for removal from the hopper and conveyor pit. The lower end of the kiln-charging incline is located in the same pit. The apron conveyor, elevator and grizzly were furnished by Link Belt Co. as was other materials-handling equipment to be described.

The charging car is of the gable-

bottom type, arranged for automatic operation of kiln top doors and for opening the car discharge doors. It was furnished by the Atlas Car and Manufacturing Co., Cleveland, Ohio. Adjacent to the foot of the incline is located the hoist house from which the charging car is pulled to the top of the kiln. The hoist is a single-drum hoist furnished by Ottumwa Iron Works, Ottumwa, Iowa, equipped with automatic controls for stopping the charging car at any pre-determined kiln. Lowering of the car is done under power also so that the hoist operator has it under full control all the time.

The incline slopes upward at approximately 24 deg. from the horizontal to the kiln top and carries the charging car on 36-in. gauge, 30-lb. rails. A walkway along one side provides access to the kiln top from the hoist house.

The kiln tops are provided with two charging doors symmetrically located on the center line of the kilns and incline. These doors open automatically by movement of the charging car into the dumping position, at which time the car door latches are unhooked, also automatically, and the car is stopped to dump into the kiln. As the car moves back off the top of the kiln, the



Burned lime is elevated to this 100-ton bin from which open hearth charging boxes are filled

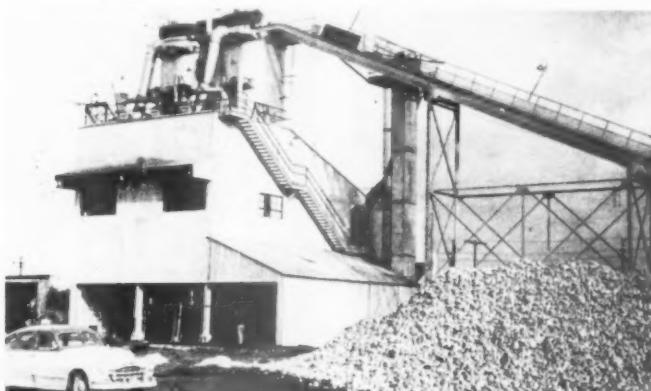
charging doors close, the whole cycle of opening, dumping, and closing not requiring more than about 10 sec. of interruption of the kiln draft for each car of stone charged.

The kilns are 10- x 12-ft. medium-size Azbe kilns equipped with center and side burners for use with natural gas. Hot zone recirculation is used to both the center and side burners to provide a means for controlling heat within the kiln. The kilns are of the "low" type, 56 ft. 6 in. high from draw floor to top flange, not having a storage zone above the exhaust gas exit point. Both exhaust gases and recirculated gases are removed from the kiln through ports and ducts built in the refractory lining and connected by external manifolds to ducts leading to the respective fans. The fans are located side by side on a platform just below the recirculation gas exit level and were furnished by Buffalo Forge Co. This fan platform has a weatherproof deck which also serves as the roof for one side of the kiln building. Suitable inter-connections and secondary vents are provided together with necessary dampers for control and regulation of flow of kiln gases through the fan.

Instrumentation

On the firing floor are located instrument panels, damper controls, gas valves and electrical equipment for operation of the kilns. The kilns are provided with adequate doors for easy access to the charge, for inspection and trimming as may be required.

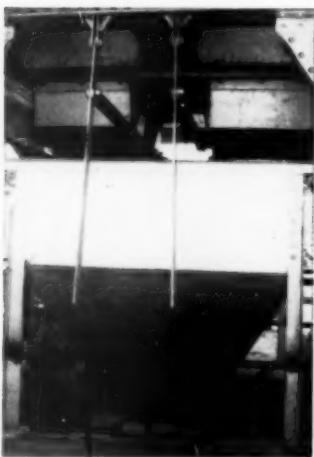
Instrumentation of each kiln includes a Leeds and Northrup pyrometer for measurement of exhaust and recirculation gas temperatures; Hays draft gages for measurement of ex-



New plant which features natural gas-fired vertical kilns with center and side burners and automatic stone charging arrangement overhead

*Azbe Corp., St. Louis, Mo.

LIME



Lime is drawn into a sectioned compartment which serves as a surge hopper. Lime is then conveyed to a storage bin.

haust and hot zone drafts, and recirculation and primary air pressures; and Brown flowmeters for recording the volume of gas being furnished to each kiln. The damper controls are manually operated at the instrument panel to make such adjustment of remote dampers in various ducts as kiln conditions dictate. There are also dampers in ducts at the firing floor level that are directly adjusted as required. Gas flow to each kiln is controlled by two valves in the main leading to each kiln and by individual valves for each of six center-burner jets and eight side-burner jets. One of the two main valves is used for overall on or off control of gas while the other is used for adjustment of the overall flow of gas to the kiln.

The refractory linings of the kilns consist principally of first quality firebrick except for a short height in the hot zone where 9 in. of 70 percent alumina is used. With few exceptions all brick are from the standard 9-in. x 4½-in. x 2½-in. series laid in a high temperature air-setting bonding mortar.

A primary air fan is located just below the draw floor on a small platform, which is intended for use in case the exhaust fan draft is not sufficient to provide adequate primary air. However, it has not been found necessary to use this fan as yet, due to removal of fines at the bar grizzly described.

Kiln Operation

At the draw floor level where the steel kiln foundations are located four quadrant type draw gates are hung, each manually operated and discharging into a draw compartment divided into four sections. The latter serves as a surge and measuring hopper from

which the burned lime can later be discharged through a Link Belt rack and pinion gate and a specially arranged feeder plate to another Link Belt 24-in. apron conveyor which is horizontal under the kilns and slopes upward at one end. At this end, it discharges to another inclined conveyor running at 90 deg. to the former and leading to a Link Belt super-capacity bucket elevator, 51 ft. centers, which elevates the lump lime to a 100-ton capacity storage bin. From this bin the lime is drawn out directly to open hearth charging boxes carried on special flat cars and can be transported to the open hearth department as needed.

The first kiln was put in operation in January of this year and the second one about a month later. The crew required to operate these kilns consists of three men per shift, namely, one fireman who is responsible for the kiln operation itself, one drawman who draws the lime and assists the fireman in trimming the kiln, and



Kiln charging doors are automatically operated when charging car is in dumping position

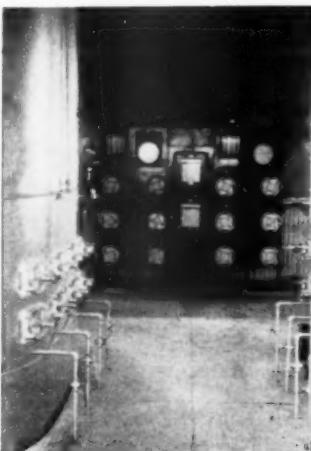
one hoister who is responsible for the stone unloading and kiln charging. The original crew hired to operate the kilns had no previous lime experience and developed into good operators with a minimum of instruction. This same crew is ample to operate several additional kilns if necessary.

Draws are made every two hours and trimming requires about five minutes at each draw. At this time the drawman comes up on the firing floor and assists the fireman so that the kiln may be trimmed from both ends simultaneously and dropped uniformly. After this, the drawman has ample time for running the drawn lime from the compartments over the conveyor and elevator system to the storage bin. After the draw, the hoister adds loads of stone at evenly spaced intervals to the top of the kiln to keep exit gas temperatures in the 450 deg. to 500 deg. range. Recirculation gases are handled at a temperature of about 800 deg., using some exhaust gases for tempering to maintain this temperature at a reasonably steady figure.

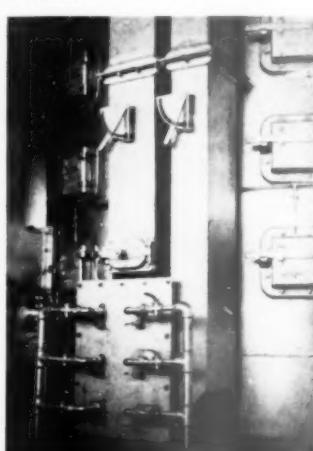
Normal kiln capacity of 40 t.p.h. was very readily obtained even with the inexperienced operating crew and gas consumption indicates use of below five million B.t.u. per ton of lime. Lime is discharged at a maximum temperature of about 150 deg. F. Further improvement can be expected as the men increase their knowledge of handling the kilns for easiest operation and best results.

Personnel

The Houston plant of Sheffield Steel Corp. is under the supervision of F. R. Macfarland, works manager. Construction of the lime plant was handled through W. C. Higdon, engineer for Sheffield, and the lime plant is under the operating supervision of T. R. Scott, open hearth superintendent; James Morrison, general foreman, and J. A. Knight, lime department foreman.



Instrument panel from which kiln operations are controlled



Closeup on operator's floor showing arrangement of ducts and adjustable dampers

Proportioning

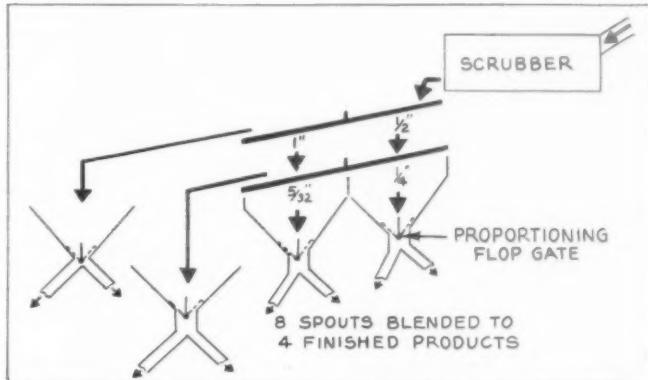
BLENDING TO MEET SPECIFICATIONS

Eagle City Sand & Gravel Co., Springfield, Ohio, builds stationary operation around unitized portable crushing plant

LOCATED on a 50-acre tract of river gravel with a tested depth of 165 ft., the plant of Eagle City Sand & Gravel Co., Springfield, Ohio, has a capacity of 150 t.p.h. of four sizes of aggregate. This \$90,000 plant was built by Clem Beals, president of Springfield Cement Products Co., as a source of aggregate for his block plant. Capacity of the new sand and gravel operation is greater than is required by the block plant however, and about 50 percent of total production is sold to state, county and city road departments as road stone and chips. Mr. Beals' son, Hugh, is manager of the sand and gravel plant.

Flop gates, located in the throats of four adjustable chutes carrying discharge from the final screen, form an interesting means of blending different grades of finished product as required. Mr. Beals, who has had many years experience in both concrete products manufacture and sand and gravel production, designed the blending system.

For the final washing and screening operation, a Cedarapids 4- x 12-ft. double-deck vibrating screen is used with four meshes on half-decks: 1-, $\frac{1}{2}$ -, $\frac{1}{4}$ - and $\frac{5}{32}$ -in., producing four sizes of aggregate, which are chuted to four truck hoppers in either straight or blended form. The flop gates may be set to take any or all of any given size, directing it to one bin or mixing it with all or any part of another stream



Layout of proportioning flop-gate spouts that enable the plant to produce a wide variation of finished product from a divided double-deck screen

(see illustration). This system permits fine gradations of size to meet exacting specifications of the block plant or state highway department; or the less rigid demands for driveway construction. Sand is chuted to a Cedarapids sand drag before falling to a truck hopper.

Because a high water table exists at this site, material has been reclaimed under water since the first half-day of operation. A Sauerman dragline scraper, 500-ft. centers, ex-

cavates with a 3-cu. yd. bucket. Power for the dragline is delivered through a chain-driven hoist from a 125-hp. Westinghouse motor. Material is reclaimed from the surge pile by a Cedarapids reciprocating feeder that discharges to a 4-ply, 24-in. belt on 16-ft. centers. From the reclaiming tunnel conveyor, material is moved up an incline by 24-in. belt conveyor on 27-ft. centers discharging to a 4- x 10-ft. double deck vibrating screen of a complete Cedarapids Junior Tandem crushing unit.

Oversize from the first deck, $1\frac{1}{2}$ -in. mesh, is chuted to a 10- x 36-in. jaw crusher set for 1-in. opening. This crusher discharges to a belt that also takes the discharge from a 16-in. x 24-in. roll crusher, set for $\frac{1}{2}$ -in. opening, that receives material retained on the second deck of the primary screen, minus $1\frac{1}{2}$ -in. plus $\frac{1}{2}$ -in. Throughs from the bottom deck, minus $\frac{1}{2}$ -in., are conveyed by the same conveyor receiving discharge from both crushers and is moved to the main plant conveyor, 90-ft. centers, which inclines up to the secondary washing screen mounted on top of four Butler truck hoppers.

After material has been blended in the flop gate chutes previously mentioned, it is chuted to the four truck



A slackline cableway recovers sand and gravel from pit, right. (Since picture was taken, motors and winches have been enclosed.) Portable plant, right center and screening and proportioning plant above truck hoppers, left

(Continued on page 121)

Chemist Corner

FINENESS OF PORTLAND CEMENT

Different methods of fineness analyses considered for seven cements investigated. Complete sedimentation analyses essential

By DR. A. R. STEINHERZ*

BY GRINDING we increase the surface of the clinker minerals, and of the added gypsum, in order to obtain the desired reaction between cement and water. It is therefore the chief aim of fineness analyses of cement to determine whether the required increase in surface was obtained. Different methods of fineness analyses are in use and some are prescribed by standard specifications, so it seems desirable to determine which of them conform best with the hydraulic qualities of portland cement, assuming that these qualities are appropriately determined by testing both rather dry and plastic mortar mixes. Seven different commercial portland cements, representing four methods of manufacture, were used for this investigation.¹ Their properties are given in Table 1.

Four different methods were used for fineness analyses of these cements: (1) sifting on the British 170-mesh sieve according to the British standard specification; (2) surface determination by the gas permeability method; (3) surface determination with the Wagner turbidimeter, and (4) sedimentation analyses² with Andreassen's pipette apparatus. By the first method, we learn (See Table 1) that the sieve residues of all the tested cements are very small. No doubt sifting is a very simple and fast test method, especially useful for detecting adulterations in portland cement. It is an essential feature of fineness analyses in most standard specifications, but is a poor method for arriving at the degree of fineness.

The permeability test also is quite simple and fast. Theoretically the total surface³ of the tested powder is a function of flow resistance only. So an ideal means for fineness analyses seems to be given. In recent years the method was the object of considerable experimental work and discussion. In summarizing the conclusions from these studies, we can state that the direct proof of the theoretical assumption

tions is still to be accomplished; moreover, in contradiction to the theory, there is a marked lack of reproducibility of results, when powder beds of different porosities are tested (4). But, the possible errors of the method in any case are comparatively small and do not prejudice its use for cement testing. On the other hand, it seems rather dubious whether total surface is the correct yardstick for measuring cement fineness.

Portland cements when ground in open circuit contain more very fine particles than those ground in closed circuit with an air separator, so their S_w values are relatively high; but, from Table 1 we can conclude that they are by no means better than the "air separator" cements of the same type. Consequently, the finest cement particles are less valuable than we would expect from their considerable share of the total surface. This means that from a practical viewpoint we need a fineness test which does not consider only the finest particles. It happens that the surface determination by Wagner's method conforms with this demand.

Likewise surface determination by

sedimentation analyses was carried out on the assumption that the hydraulic active surface of particles less than a certain limit in size equals that of the same weight percentage of the limit size. There is a reasonable agreement between the results of the Wagner test and those of the sedimentation analyses. Moreover, the surface values by these methods conform quite well with the strength values (See Table 1). There remain, of course, still some minor discrepancies, probably caused by different chemical composition of the cements and by peculiarities in clinker burning. Some indication in this direction is given by the values of free lime and of specific gravity.

Calculating Surface

Particle size is the essential criterion in fineness analyses, but unfortunately, there is not full agreement on its meaning. Usually a geometric interpretation is proposed by relating the volume of the irregularly shaped particle with that of a regularly shaped body, e.g. a cube or a sphere (2). But it seems preferable to base physical considerations on a definition depending on the physical behavior of the particle, relating its size to the diameter of the sphere which settles with the same velocity. Incidentally, this definition implies a quite simple

Cement No.	1	2	3		4		5	6	7
			Open circuit grinding	Type 1	Closed circuit with air separator	Open circuit grinding			
PARTICLE SIZE DISTRIBUTION									
By sifting:	93.6	98.6	99.4	98.7	99.8	99.9	99.9	99.9	99.9
By sedimentation:									
40 microns	65.9	68.3	78.9	75.0	82.2	88.2	89.0	89.0	89.0
20 microns	41.5	44.7	49.4	45.0	58.2	66.1	66.8	66.8	66.8
10 microns	23.4	26.3	25.7	24.4	36.2	39.4	42.3	42.3	42.3
7.5 microns	18.0	20.6	19.5	19.5	29.1	30.6	33.3	33.3	33.3
5 microns	11.9	14.6	12.2	13.4	21.4	20.7	24.8	24.8	24.8
2.5 microns	3.8	6.9	3.4	6.0	11.7	7.6	12.0	12.0	12.0
SURFACE									
BY:					Sq. cm. per gram				
Permeability test	S_w	3780	3970	3380	3240	6280	5100	5450	
Turbidimeter	S_t	1680	1845	1680	1740	2660	2500	2770	
Pipette apparatus	S_{pi}	1560	1770	1670	1720	2310	2340	2580	
TENSILE STRENGTH									
BRIT. STAND. SPEC.					Dry mortar mix p.s.i.				
after 3 days	570	510	480	510	630	750	540		
after 7 days	520	520	660	590	630	750	640		
BENDING STRENGTH									
SWISS STAND. SPEC.					Plastic mortar mix kg. per sq. cm.				
after 3 days	47	40	52	43	57	62	61		
after 7 days	59	47	59	60	62	70	70		
COMPRESSIVE STRENGTH									
SWISS STAND. SPEC.					Plastic mortar mix kg. per sq. cm.				
after 3 days	340	240	400	210	380	610	320		
after 7 days	480	270	460	380	510	680	590		
SPECIFIC GRAVITY									
	3.18	3.14	3.18	3.16	3.14	3.18	3.14		
FREE LIME (percent)									
	0.96	1.68	0.33	0.84	2.43	0.66	1.68		

Table 1: Properties of the seven cement types studied

*Cement Chemist, Yajur Nesher, Israel, Palestine.

1. For the Long-Time Study of Cement Performance in Concrete of the A.A.U. (see Jour. Am. Concrete Inst., Vol. 19), very different cements produced under rather different conditions were chosen. It therefore seems difficult to draw any conclusions on the influence of fineness on their hydraulic behavior. So, these cements are not considered in this paper.

2. The term sedimentation analyses is used in this paper exclusively for Andreassen's method, although Wagner's method likewise is essentially a sedimentation analysis.

3. For sake of simplicity the term "total surface" is used in this paper instead of the more exact "total outer surface."

CHEMIST CORNER

geometric relation. Since Stokes' law stipulates that settling velocity is a function of the surface, the surface of the particle should be equal to that of the hydraulic equivalent sphere, also for different volumes. Indeed, it has been experimentally proved that the average surface of irregular, but equally fast settling particles, is practically the same as the surface of spheres the diameter of which are calculated for this settling velocity according to Stokes' law (11).

In order to obtain a fuller understanding of fineness we will calculate the total surface from the particle size distribution, first on assuming that the particles are really sphere shaped. There may be dN particles with the dia. X and with a total surface dS ; their weight should be dC and their specific gravity g . From this follows:

$$dS = dN \cdot X^2 \pi$$

$$dC = dN \cdot \frac{X^2 \pi g}{6}$$

$$dS = \frac{6}{g} \cdot \frac{dC}{X}$$

$$S = \frac{6}{g} \cdot \int_{X_{\min}}^{X_{\max}} \frac{dC}{X} \quad \dots \dots (1)$$

If C is measured in percentage and X in microns, we shall multiply the numeric value of the integral by 100 in order to obtain the surface in square centimeters per gram. The surface is an absolutely one meaning function of two variables; both of them may therefore be used for the definition of the limits of the integral. For convenience X_{\max} and X_{\min} are chosen. While X_{\max} can easily be determined by extrapolation from the distribution curve to the line $C = 100$ percent, the ex-

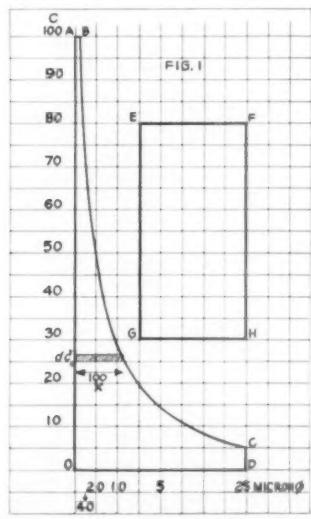


Fig. 1: Surface area based on fineness of 2.5 microns

TABLE 2
Sedimentation of portland cement Z in ethyl alcohol at 25 deg. C.
 $g(\text{cement}) = 3.18 \text{ g}$, $S = 0.79 \text{ g}$, $V = 0.11 \mu$

min	h cm	mg	X microns	100 $\frac{1}{X}$	C Percent	$\log \left(\frac{100}{100-C} \right)$	$\log X$
0		154.4			100.0		
1	12.10	115.8	41.3	2.42	75.0	0.7797 - 1	1.6157
3	11.68	82.4	23.4	4.27	53.4	.5203	.3695
6	11.26	63.8	16.2	6.16	41.3	.3647	.2105
10	10.84	51.7	12.4	8.10	31.4	.2575	.0918
20	10.42	37.5	8.7	11.7	24.5	.0844	.0327
40	10.00	21.0	5.93	16.9	17.0	0.9069 - 2	.7733
60	9.58	14.4	4.74	21.1	13.6	.5028	.6759
100	9.16	9.6	3.59	27.8	9.33	.6294	.5553
150	8.74	6.2	2.86	34.9	6.22	.4456	.4570
200	8.32	7.6	2.42	41.3	4.92	.3404	.3839

Particle size distribution

C percent

By sifting on 170-mesh sieve (89 micron nominal aperture)			97.5
From Rosin-Rammler diagram:	$\log X$	$\log \left(\frac{100}{100-C} \right)$	
	1.60	0.755 - 1	40
	1.30	.453	20
	1.00	.148	10
	0.70	0.830 - 2	5
	0.40	.555	2.5

Determination of $S_{2.5}$

Gates area 5000 sq. mm.	321.5 mg 429.7 mg	100 $\frac{1}{X}$	Series of trapeziums $\left(\frac{100}{X} \right) \text{ ev}$	ΔC	ΔG
$S_{2.5} = 1764 \text{ sq. cm. per gram.}$		0.50			
		2.42	1.61	25.2	40.2
Simpson's rule		4.27	2.34	21.6	72.1
0 100.0	100.0	6.16	5.22	12.1	63.2
10 27.7	$4x27.7 = 110.8$	8.10	7.13	8.2	58.5
20 14.4	$2x14.4 = 28.8$	11.7	9.90	8.6	86.1
30 8.2	$4x 8.2 = 32.8$	16.9	14.3	7.5	107.3
40 5.1		21.1	19.0	8.4	64.6
		279.5	24.4	4.27	104.2
	$\frac{10}{3} \times 279.5 = 291.7$	34.9	31.4	8.11	97.7
	3.18	40.0	37.4	11.12	41.9
	931.7×6	40.0	40.0	5.1	204.0
$S_{2.5} = \frac{1758 \text{ sq. cm. per gram}}{3.18}$	$S_{2.5} = \frac{938.8 \times 6}{3.18} = 1772 \text{ sq. cm. per gram}$				Gates' area = 938.8

Note: In the column "mg" the ignited residues of 10 ml. suspension, corrected for the CaCl_2 addition, are recorded.

Table 2: Sedimentation of cement, size distribution, and determination of $S_{2.5}$

trapolation of X_{\min} involves certain assumptions which were subject to criticism. (5).

Far more important is the question on the technical significance of the geometric X_{\min} . There are strong indications that considerably larger cement particles yield the maximum quantity of reaction products in contact with water. When this assumption is true, then further comminution beyond the limit size is superfluous and the limit size itself must be chosen, logically, as lower limit of the integral. No direct determination of the limit size was made up to now. It may be that different values would be found for different cements. For technical fineness analyses of cement which aim at comparable results only, an approximate value of 2.5 microns is proposed. This proposition is supported by the researches of Anderegg and Hubbel (1) on the hydration depth of portland cement and its constituents. So, hydraulically effective surface may be defined as follows:

$$S_{2.5} = \frac{600}{g} \left[\int_{2.5}^{X_{\max}} \frac{X_{\max} \cdot dC}{X} + \frac{C_{2.5}}{2.5} \right] \dots (2)$$

A fuller understanding of this equation is gained from the graph in Fig. 1. This kind of representation,

first proposed by Gates (6), shows C as a function of $\frac{1}{X}$. The area $G = OABCD$ is obviously proportional to the expression between the brackets in the foregoing equation. When, as in

Fig. 1, the abscissa is $\frac{100}{X}$ instead of $\frac{1}{X}$, the numerical value of the area G should be multiplied by $\frac{6}{g}$ only:

$$S_{2.5} = \frac{6}{g} G \dots (3)$$

The numerical values of $S_{2.5}$ conform reasonably with the S_T values obtained by Wagner's method according to designation C 115-38T. According to this designation, several points of the particle size distribution curve downwards to 7.5 microns are ascertained and from these measurements the value of S_T is computed by means of a general formula. No discussion of this formula is here intended, but it seems justified to call special attention to the fact that by the use of the formula, a C value for X_{\min} is assumed, depending upon $G_{2.5}$ only. A glance at Table I shows that this assumption is sometimes true, and some-

CHEMIST CORNER

times not. For instance the results of 3 with cement 4 or cement 5 with cement 6 are not true at all. Obviously, for more exact results, an analysis down to 2.5 microns is necessary.

The master sample 114c of the National Bureau of Standards was analysed with the pipette apparatus and S_{10} was calculated according to (3). Here an absolute conformity of the official value and that found occurred. This conformity is, of course, somehow fortuitous.

Summarizing, we may state that a fair measurement of the hydraulically effective surface is attained by determining S_{10} or S_r , respectively. On the other hand we learn from Table I that these values are not yet sufficient to give a full determination of cement fineness. The cements No. 2 and No. 4 have almost equal S_{10} values and rather different particle size distribution. Cements No. 5 and 6 are a still more striking example of different particle size distribution and equal S_{10} values. It is therefore highly desirable to know the C values of some characteristic particle sizes; for experimental reasons it is convenient to interpolate them from a suitable graph. Rosin and Rammler (8) proposed to take as abscissas $\log X$ and as ordinates $\log \left(\frac{100}{100 - C} \right)$. Then

an almost straight line is obtained between the abscissas 5 and 40 microns, i.e. between 0.7 and 1.60 (see Fig. 2). The basic assumption of this representation is the validity of a specific probability law. Austin (3) believes that the particle size distribution of ground powders obeys the logarithmic probability law. In this case the graph on logarithmic probability co-ordinates should yield a straight line. Fig. 3 shows that Austin's assumption conforms less with the particle size distribution of portland cement than Rosin-Rammler's, when the interval 2.5 to 40 microns is considered.

Irregular Shapes vs. Spheres

The foregoing considerations necessitate some elaboration. In developing the formulas (2) and (3) we made the assumption that the particles are sphere shaped. In this connection we mentioned that the average surface of the irregularly shaped particle is practically equal to that of a sphere which settles with the same velocity. This, of course, holds true only when extreme shapes, like very thin flakes and elongations, are excluded. Actually, most of the particles are moderately flat; obviously their number per gram is greater than the number of spheres with equal settling velocity. This means that the actual surface per weight of a certain particle size is considerably larger than that we calculated for spheres. If N is the number of particles per gram of the size X and N_s the relevant number

of spheres with the dia. X , then $\frac{N}{N_s}$ will be the ratio of the actual to the calculated surface. This ratio is not constant, but dependent upon the particle size. Besides, different values of

$\frac{N}{N_s}$ have been found not only for

different powders, but for different portland cements too. For a certain portland cement, $\frac{N}{N_s}$ values ranging from 1.1 to 1.9 were determined for the size range of 5 to 60 microns (11). From this it follows that the great difference between the surface values from the permeability test and the other surface values is partly caused by the assumption of sphere-shaped particles for the calculation by the latter methods.

Significant Particle Size Range

In the foregoing paragraph we reached the conclusion that the fineness analysis of portland cement consists essentially in the determination of the particle size distribution to 2.5 microns downwards. The percentage

of coarse particles is determined by sifting, that of the smaller ones by sedimentation. Elutriation is generally less suitable. The correct execution of the analyses may be derived from Fig. 1. We observe that the curve between X_{max} and 40 microns is a very steep and almost straight line. So, one point in the region of 100 microns, gained by sifting on the 170-mesh sieve or on the 200-mesh sieve is sufficient. Schweyer and Wark (10) found a ratio of 1.2 for the rate of the particle size as determined by sedimentation and the nominal sieve aperture. A similar result was obtained by the author (11). This ratio must be used where results of sieve analyses and of sedimentation are represented in one graph. When using Gates coordinates, the influence of the ratio on the exactness of the surface determination is, fortunately, small. The interval from 40 to 2.5 microns includes the most important part of the particle size distribution. In this interval, particle size is calculated from Stokes' law. The question whether it is exactly true for this region is therefore of paramount importance. For obvious reasons we limit the discussion of this problem to two principal suppositions. The first concerns the existence

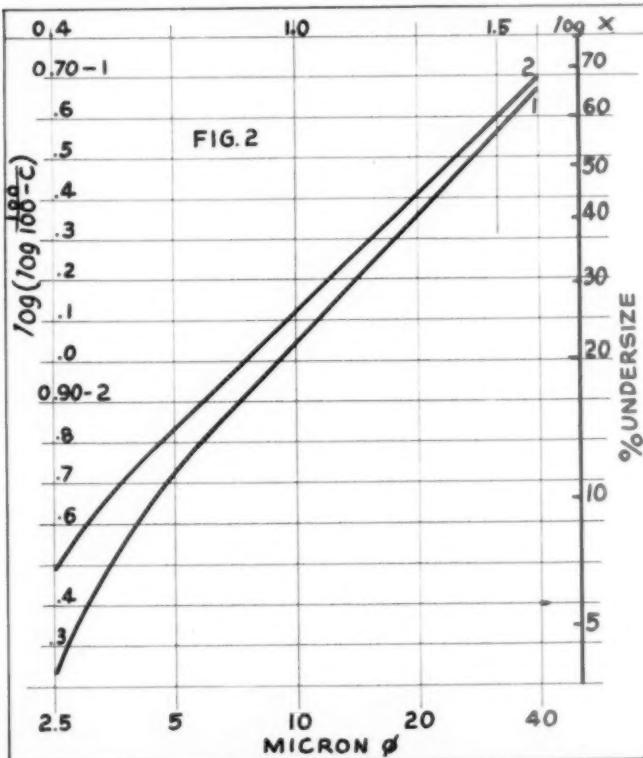


Fig. 2: Particle size distribution as plotted by Rosin and Rammler

tence of a true viscous flow or, more exactly interpreted, of a small Reynold's number. According to Gaudin (7) this number R should obey the following formula:

$$R = \frac{X^2}{18} \frac{(g-s)}{v^2} \leq 0.6$$

where s means specific gravity and v viscosity of the suspension medium, g the gravitational acceleration. (The meaning of g and X is the same as before). On substituting the numerical values for a suspension of portland cement in ethyl alcohol at 25 deg. C we calculate the limit size X_{lim} of particles which still settle according to Stokes' law:

$$X_{lim} = \left(\frac{0.6 \times 18 \times 0.11^2}{981 \times 2.37 \times 0.79} \right)^{1/2}$$

micron \approx 90 micron

A X_{lim} value of similar magnitude would be obtained for portland cement kerosene suspensions. Since particle size from 40 microns downwards is determined, the assumption of a true viscous flow is doubtless justified.

The second supposition concerns the concentration of the analysed suspensions. Theoretically the suspension should be infinitely diluted. Practically a concentration of about 0.5 percent per volume is used for analyses with Andreassen's apparatus and of about 0.03 percent per volume for those with Wagner's apparatus. There was therefore room for doubt whether the results obtained with Andreassen's method are influenced by too strong a concentration (9). There are two reliable tests for the existence of a sufficiently dilute suspension: checking of sedimentation analyses at different concentrations and by the use of different suspension mediums. The first test was executed for most of the cements investigated, the second (use of methyl alcohol instead of ethyl alcohol) in one case only. No differences beyond the usual experimental errors were found.

For the sake of completeness we have still to mention that a principal, but small error, is caused by the differences in specific gravities of the different clinker minerals and of the added gypsum. There is no means to eliminate this error in all methods which are based on Stokes' law.

Experimental Methods with Pipette Apparatus

Since the use of Andreassen's pipette apparatus is less frequent than that of Wagner's turbidimeter, some information on experimental details, proved by the experience of many years, may be interesting. For suspending portland cement, absolute ethyl alcohol with an addition of about 0.1 gram CaCl₂ is recommended. During the whole sedimentation period the apparatus is suspended in a waterbath thermostat, the water level being

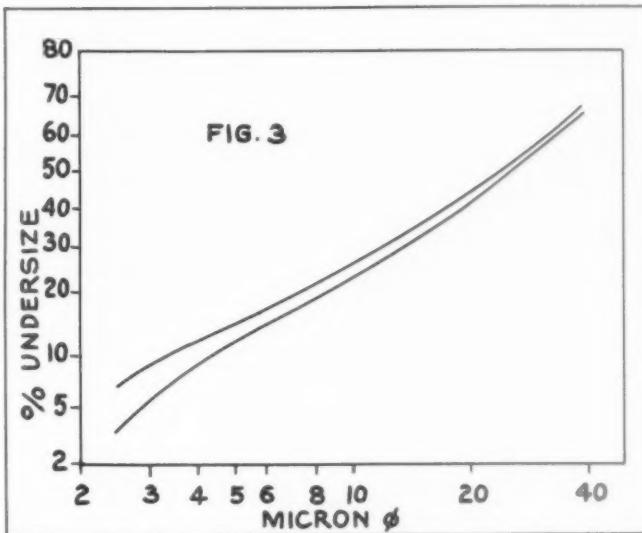


Fig 3: Relation of particle size distribution to logarithmic probability law

never less than the liquid level within the sedimentation cylinder. The homogenization of the suspension is effected by repeated reversion and vigorous shaking of the apparatus for two or three minutes. Immediately after homogenization, the apparatus is suspended in the thermostat. This is the zero time for the sedimentation period. The initial height of the sedimentation column, h_0 , should be about 12 cm. From h_0 ; the initial volume v_0 and the concentration C_0 are calculated. The direct determination of C_0 at zero time would yield erroneous results for cement alcohol suspensions, since the settling velocity is too great. Absolute ethyl alcohol is very hygroscopic; therefore the hole in the male part of the ground-in pipette is closed by a small ball of bees wax or similar material. The wax is not removed except for taking the samples and immediately thereafter put in place again. The samples are dried in weighed crucibles (preferably platinum crucibles) and then ignited for five minutes at about 1000 deg. C. By this procedure eventual traces of stopcock grease are burned which may have accidentally gotten in with the sample in the crucible. Besides this the small amount of CaCl₂, added as an antiflocculation agent, is partly evaporated, partly transformed into CaO. By this artifice, weighing becomes more exact and convenient, since CaO is less hygroscopic than CaCl₂. A blank test for CaCl₂ correction is made for each sedimentation analysis by evaporating 10 ml. of the suspension medium and igniting the residue in exactly the same manner as the samples.

Different ignition temperatures and

periods may yield different correction values for CaCl₂ and cause serious errors in the range of fine particles. It is better to take the samples at fixed times and to calculate the particle size than to calculate the sampling times from the height of the sedimentation column for previously chosen particle sizes. For interpolation of desired points of the particle size distribution curve and for correction of errors the Rosin-Rammler diagram is used. Fuller information on experimental details may be obtained from the following, abridged, record of an actual fineness analysis. The graph, Fig. 1, corresponds to this test. (See Table 2 also.)

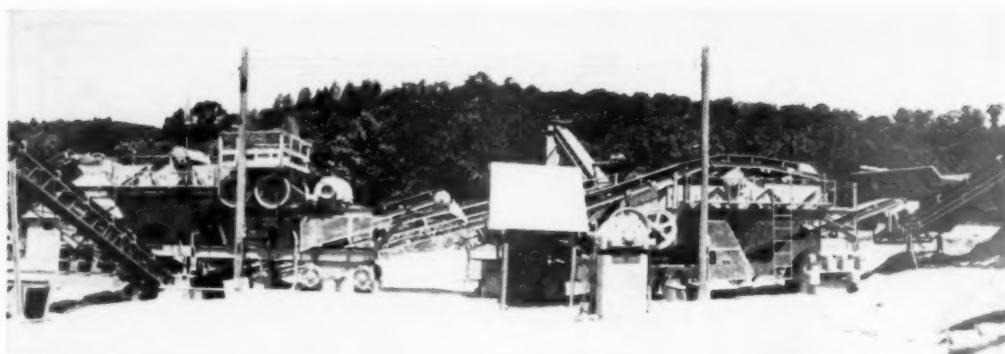
The $S_{2,5}$ value is calculated according to formula (3) from G (Gates' area). For the determination of the latter, two reasonably exact methods are recommended. The first consists in drawing the particle size distribution curve in using Gates' co-ordinates, cutting out and weighing the areas OABCD and EFGH and comparing their respective weights. Although generally quite simple, this method demands some dexterity and, also coordinate paper of uniform thickness. When the linear scale of the diagram is enlarged by 2: 1 (as in Fig. 1)

the factor $\frac{6}{\pi}$ is substituted by $\frac{6}{vg}$. The

second method is based on numerical calculation only. A series of trapezia is substituted for Gates' area. An infinite approach to the theoretic value of the area could be obtained by calculating a great number of trapezia. Experience proved that

(Continued on page 122)

Crushing



Partial view of portable crushing plant being operated by John T. Dyer Quarry Co. Secondary crusher set-up is at the left. Note double fly wheels on the twin jaw crushers. Third and final reduction crusher is at the right.

Established Stone Producer Adds Portable Plant

John T. Dyer Quarry Co., Birdsboro, Penn., has new portable crushing plant to extend marketing range in meeting competition

MANY FACTORS were taken into consideration in a decision made by the officers of the John T. Dyer Quarry Co., Birdsboro, Penn., to purchase and operate an up-to-the-minute portable crushing plant. Some of these factors are of special importance to any producer planning to take a similar step. During the pre-depression days of 1929 the company had large operations in Pennsylvania with a considerable number of employees. When the depression hit, conditions found the firm with a goodly number of construction jobs that were all some distance from the established plants, so it did not get that business. Other operators moved in with portables. Now, come what may in the form of a recession the company can go to the business instead of waiting for the business to come to it.

A second factor important to the company is the anti-debris laws that are being enforced in the state which prohibit putting off-colored materials in any stream in the state. Therefore those aggregate producers with washing plants have, in many cases, a problem on their hands. In compliance with this law, the John T. Dyer Quarry Co. has changed all processing from wet to a dry basis and a portable plant set-up works into this general theme admirably. A third factor possibly is that the company has its eye on the aggregate that would soon be going into the Pennsylvania Turnpike extension which, when completed, will connect Pittsburgh, Har-

risonburg and Philadelphia with a broad, high-speed highway similar in detail to the section of the Turnpike that was built during the early 30's. At the time of this writing (early August, 1949) contracts are being let on the extension work and in a few spots construction work already has started.

Portable Plant Setup

The John T. Dyer Quarry Co. has placed the new Cedar Rapids portable plant in operation at its Trap Rock, Penn., quarry. This quarry is in the

Birdsboro, Penn., region, a short distance east of Harrisburg. The new plant is on the Reading railroad and close to Highway No. 82. The rock at this quarry is said to be one of the hardest trap rocks in the country.

The various units making up the installation have been mounted in a very neat and orderly manner in the form of the letter "L," giving the project a very pleasing appearance. The new plant is served by two Euclid 18-ton, rear-dump trucks with two International trucks being used for stockpiling.

Power for the plant is supplied by three Murphy diesels that each drive an Electric Machinery Co. a.c. generator. There is one 125 kva. unit, and the other two diesels drive 156 kva. Electric Machinery units. The engines and generators are housed in a neat structure near the primary crushing plant and the building includes a control room for the Cutler-Hammer and Bull Dog controls.

The use of a portable plant as a mainstay producer for an established crushed stone operator is no novelty on the Pacific Coast. There it is common practice for the state to "certify" certain deposits of rock as being up to standard. Bids are then made on that basis and the company contracting the job moves its portable from the home plant and uses it until the job is completed. Then it moves the portable back to home base until another distant job shows up. Nor is



End loader with dozer blade handling stripings for road building

CRUSHING

the use of portable plants in the Middle West a novelty; however, in the East the idea of an established producer having and running one is noteworthy and its work will be followed with interest.

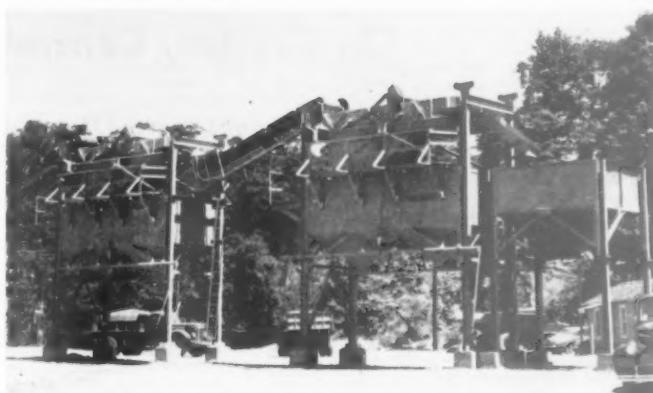
The plant was purchased last year through L. R. Smith, Inc., Camp Hill, Penn., well known heavy machinery distributor in that section. However, it was not put into use until this year. Inasmuch as the quarry here has been working primarily on riprap, the new owners are a little reluctant to give hourly production achievements of the new portable except to say they are satisfied with its performance.

The new plant has a 32- x 40-in. primary jaw crusher that is fed by a 42-in. apron feeder. The secondary crusher is an 18- x 36-in. twin jaw and the final reduction crusher is a 12- x 18-in. twin jaw. All are powered by individual electric motors through V-belt drives. In the screening sequence the dirt is first screened out. Ballast, screenings, $\frac{1}{4}$ -in., 1-B, and 2-B are produced and, lastly, oversize falls into a steel truck-loading bin from which such materials can be returned to the primary crusher or otherwise disposed of.

The twin jaw crusher is a Cedar Rapids development. This type of crusher has two movable jaws operated by two eccentrics and two fly wheels. It is said to greatly increase capacities and to give the unit a smoother and more balanced operation.

Quarry

The brow of the quarry is very uneven and rugged, but by a judicious choice of equipment and of roads over which to operate, stripping is conducted in an efficient manner. A $\frac{3}{4}$ -cu. yd. Bucyrus-Erie shovel loads to a Koehring and a Case unit of similar design. The debris from strip-



Final double-deck screens over truck bins, with oversize bin to right

ping is being used to improve the roads to the area being stripped and a Hough endloader, rubber-mounted, provided with a small dozer blade, keeps the road level. It also pushes loose soil up to where the shovel can reach it easily.

Primary churn drilling is done by contract. Air for secondary drilling is supplied by a rubber-mounted, Gardner-Denver air compressor powered by a D-13000 Caterpillar diesel. Loading in the quarry is done by a 2-cu. yd. Lorain shovel. For secondary drilling, Timken detachable rock bits are used.

Hugh Craig is president of John T. Dyer Quarry Co., J. A. Conway is secretary-treasurer, and T. C. McPoyle is assistant secretary-treasurer and sales manager. Mr. McPoyle also is president of the Pennsylvania Stone Producers Association. Jasper Wamsler is superintendent at the quarry.

A.L.I. Membership

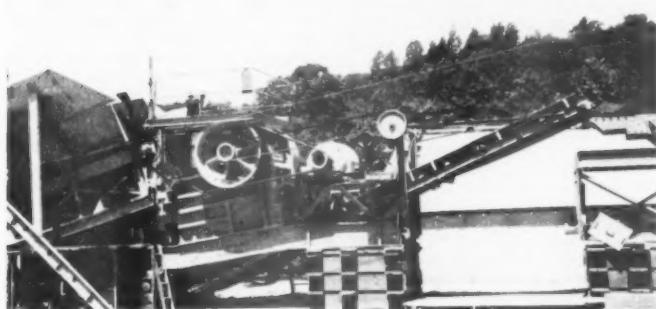
AGRICULTURAL LIMESTONE INSTITUTE representatives, meeting with National Crushed Stone Association, and Manufacturers Division representatives, have agreed upon the following points in reference to a suggestion that dealers, agents, or individual representatives of manufacturers of machinery and supplies be eligible to become members of the institute:

1. Members of the Manufacturers Division of N.C.S.A. should automatically be associate members of A.L.I.

2. Twenty percent of the dues received by N.C.S.A. from members of the Manufacturers Division should be allocated to A.L.I. effective January 1, 1949; and, further, 20 percent of the net revenue derived from the sale of exhibit space for the exposition in conjunction with the next annual convention at the Stevens Hotel, Chicago, Ill., in January, 1950, should be allocated to A.L.I.

3. A new classification of membership in A.L.I. should be established to be known as "contributing members," to include the group formerly defined as "associate members" and a new group of dealers, agents, or individual representatives of manufacturers of machinery and supplies.

As a result of the foregoing actions, an intensive campaign is to be undertaken to obtain the memberships of suppliers of machinery and equipment. Thus, two types or classes of membership are involved: (a) dealers, agents, or manufacturers' representatives, eligible for class B contributing membership, dues \$25 per year; and (b) manufacturers of machinery and supplies, eligible for membership in the Manufacturers Division of N.C.S.A. and who, upon election, automatically become associate members of A.L.I., dues \$150 per year.



Trucks dump to receiving hopper ahead of 32- x 40-in. primary jaw crusher. Offbearing belt delivers to 42-in. x 10-ft. pan conveyor feeder, right

Readers Discuss Articles

On Cement, Concrete and Aggregates

Explanations and Theories that are Helpful

SINCE THE WRITER DISCUSSED the new specifications of the U. S. Army Engineer Corps for civil projects—mostly large dams—in our December, 1948 issue, we have had some interesting and helpful correspondence from readers who are experts. Some of their ideas have probably been unconsciously reflected in our subsequent articles on cement, concrete and aggregates, although in the main these ideas are the result of extensive and intensive reading of much published material readily available to all interested. It is time however, to summarize some of this correspondence, so here it is, assembled not necessarily chronologically, but by subject matter.

U. S. Army Concrete— Byram W. Steele

Byram W. Steele, chief, Structures Branch, Engineering Division, Civil Works Office, Chief of Engineers, U.S.A., sent us the following communication:

"I have enjoyed reading the articles appearing in the December issue of ROCK PRODUCTS, and especially the one entitled 'Durability—Perfect (?) Aggregates and Concrete.' In this article it was noted that you have made a rather extensive analysis of fine aggregate grading and the specifications therefor, but that you made no reference whatsoever to the kind of concrete in which such fine aggregate is to be used.

"This procedure is totally foreign to my concept of this entire matter. Fine aggregate gradation *per se* means nothing insofar as I am concerned. In other words, a desirable fine aggregate gradation for the garden variety of building trades concrete is not a question that need cause any particular concern, whereas fine aggregate gradation for use in lean interior mass concrete mixtures, in which not more than 2½ bags of cement per cubic yard are used, becomes a matter of prime importance.

"If the cement content of a cubic yard of concrete is reduced from 6 to 5 to 4 to 3 to 2½ bags per cu. yd. and possibly lower, the placing difficulties become increasingly greater because low cement contents necessitate increasing the maximum size of aggregate. Hence, in order to maintain a satisfactory degree of placability, the grading of the sand must be improved over that necessary for ordinary building trades concrete work, and it must be closely controlled as to uniformity in order to maintain satisfactory control of mixing water.

By NATHAN C. ROCKWOOD

"The question of what is the minimum cement content in a cubic yard of concrete for an interior mix will not be discussed here, except to say that competent authorities have all agreed that for mass concrete for dams, cement contents of two bags per cubic yard, such as was used in Elephant Butte and Arrow Rock Dams, 25 or 30 years ago, are entirely adequate.

"The question of gradation, therefore, resolves itself into what is the gradation necessary to permit satisfactory placement with low water-cement ratio and low cement content, and how close a control is necessary over the uniformity of this gradation in order to produce satisfactory and uniform concrete. Your statement relative to the limitation of 1/10th in the fineness modulus does not happen to be a fact since there are jobs now under construction in which this limitation is being complied with to all practical purposes. I also wish to call to your attention that this stipulation is a necessary means of obtaining a

desirable degree of uniformity. Perfection is not possible in any manufacturing process, but a near approach to such a perfection can be obtained in a manufacturing process that is suitably designed and operated. This has been amply proven on projects so constructed.

"The writer [Mr. Steele] is of the impression that in order to correct the record of misconception conveyed by your article in the December issue of ROCK PRODUCTS, this letter should be printed in its entirety and possibly amplified by further data on this subject. In this connection it is suggested that the inclosed reprint might give you a viewpoint relative to aggregate production that you have not had heretofore. I have always been very willing and anxious to work with the industry for a practical accomplishment that is indicated necessary, but I resent your approach to this entire matter in the December issue, above cited."

Concrete in Large Dams

The reprint which Mr. Steele referred to above is a paper delivered by him at an international conference on large dams held in Stockholm in 1948. We are sorry we did not have a copy of this at the time the article in our December issue was written for it gives the entire philosophy behind the Army Engineer practice, and we could have avoided speculation about it. However, we were not far off in our speculations, except, as Mr. Steele points out in his letter, that the concrete and ingredients specified for it by the U. S. War Department are for massive structures only. Nevertheless, what are good principles for concrete in large dams must also be good for concrete in other kinds of projects where the objective is permanence rather than strength, or in many instances merely early strength.

Mr. Steele was formerly an engineer with the U. S. Reclamation Service and has had many years of first-hand experience with the design and construction of large concrete dams. His Stockholm conference paper is an excellent résumé of some of this experience, and we shall have other occasions to refer to it. Here we can merely touch on some of the high points that bear particularly on the remarks made in our December issue article, to which he took exception.

The first thing that stands out in Mr. Steele's paper is the acknowledgement that: "The accelerated rate of deterioration in concrete structures in

Correction

WE NOTE an error on p. 184 of our August issue in the article on "Confusion of Research Data." This error is not very important to our discussion of the changes that have taken place in the constitution of portland cement during the last half century, and probably was unnoticed save by a few cement chemists. In speculation on the composition of Lehigh Valley cement of 1902, based on a chemical analysis showing the oxide contents, we used 3.07×21.31 (the percentage of silica) as showing a $2\text{CaO} \cdot \text{SiO}_2$ content of 65.4 percent. The figure 3.07 is the ratio of the molecular weight of $2\text{CaO} \cdot \text{SiO}_2$ to the molecular weight of CaO . We should have used 2.87×21.31 , since 2.87 is the ratio of the molecular weights of $2\text{CaO} \cdot \text{SiO}_2$ and SiO_2 . Hence, the amount of $2\text{CaO} \cdot \text{SiO}_2$ necessary to use up all the silica is 61 percent, leaving about 8.25 percent to be accounted for as $3\text{CaO} \cdot \text{SiO}_2$. This is not enough different from the results erroneously arrived at to change our argument.

—N.C.R.

the United States built in the past twenty or twenty-five years is such as to call for an exhaustive analysis of all the causes of disintegration to the end that structures in which more than one baneful influence is at fault ***." This obviously is a sweeping acknowledgment that during the last 20 or 25 years something has gone wrong with concrete construction materials or practices—something that possibly did not enter the picture prior to 20 or 25 years ago.

It seems to us that the logical way to attack such a problem is to ask ourselves what has happened to the concrete ingredients and the practices applied in their use in the last 20 or 25 years to account for this "accelerated rate of deterioration." Mr. Steele apparently assumes at the very start that the cement is the same as it was or better, and aside from mention of the present Types I, II and IV, there is no discussion of the part the cement itself may have had. Instead, he blames the major part of the difficulties encountered in the last 20 or 25 years on "the enormous expansion of the public works program" and the use of materials from "new and untried sources of concrete aggregates," that "have been opened up overnight and concreting operations started in a short period of time without adequate investigation of the possible sources of supply and tests to prove which source within economic range is the most acceptable for long-time concrete durability." It seems to us this statement assumes that some recent sources of material for some reason have not made as good aggregates as older sources, although so far as any one knows, they cannot be very different from aggregates previously used, as for instance in the construction of the Elephant Butte and Arrow Rock dams.

With that as his theme, Mr. Steele launches into his discussion of the shortcomings of aggregates in general and of some of those produced recently in particular. Here are developed the details of the requirements for aggregates, with which readers are familiar from the articles published in *ROCK PRODUCTS* (New Army Engineer Tests for Aggregates, September, 1948) and (Perfect? Aggregates and Concrete, December, 1948). Particular stress is placed on fine aggregate grading and preference is expressed for "manufactured" aggregates, largely because they can be graded more readily to the desired specification.

On this subject, Mr. Steele, in his paper on dams, says: "Obtaining uniformity in manufactured sand does not seem to be a problem. The variation in gradation is not great from hour to hour or from day to day. The problem is to select equipment that will produce economically and on a commercial scale the gradation desired. Flexibility in the plant and ample room to install, if necessary, several different types of reduction and processing equipment is mandatory. Ample time

must be allowed to perfect the aggregate manufacturing process before concrete operations start."

Mr. Steele then emphasizes the necessity of low water-cement ratios, particularly with lean mixtures, in order to obtain "reasonable impermeability" over a long period of years. He says a water-cement ratio of 0.7 by weight for lean interior mixes using coarse aggregate up to 6 in. in size is possible if the fine aggregate is properly graded. Here, in his use of terms, it would seem that he is confusing "permeability" with "porosity," as we have discussed the meaning of the two terms in *ROCK PRODUCTS*, August, 1949, p. 89. There is much evidence both old and recent that it is the size of and the abundance of the pores and capillary channels, rather than the permeability that is destructive of mortar and concrete, because excess water, excess cement and poor grading of fine aggregate and of cement all tend to increase the number of fine pores, rather than affect the permeability.

Mr. Steele is a strong advocate of air-entrained concrete on the theory that the entrained air makes possible the reduction of the cement content—in other words makes lean mixes workable, without the use of very fine aggregate, which tends to require greater water-cement ratios. The reason why air entrainment apparently makes concrete more resistant to disintegration of course is not known. However, one reason may be that the air bubbles are enclosed in films of water and dilute mineral solutions, and consequently air entrainment provides a better and more uniform distribution of water and possibly of the alkali and calcium hydroxide solutions. Another reason may be that air entrainment makes disconnected pores in the concrete of too large a size for capillary effects—those of the type and size so destructive of hardened cement paste, mortar, concrete and aggregates, when pores of this type predominate. In terms of colloid chemistry, materials with pores and capillary channels of this size have adsorptive properties—and adsorption creates swelling and hence interior stresses.

The reference Mr. Steele makes in his paper to the Arrow Rock and Elephant Butte dams is particularly significant. These are about the best "exhibits" in the records of Reclamation Service construction works. Both are over 30 years old, and the concrete in them, in general, is in excellent condition. Mr. Steele uses them as proof of the efficacy of 2-bag per cu. yd. concrete. The fact is that cement used in the construction of these two dams was what was known as sand-cement. The government bought commercial portland cement, as it was then made, and reground it at the site of the dams with about an equal amount of native rock—in one case a sandstone, in the other a granite. This blend was ground to 90 percent through a No.

200 mesh, which was considerably finer than commercial portland cement of that day. The blended or sand-cement was used in the same proportions with fine and coarse aggregates as the commercial portland cement would have been used, which meant that only approximately 2 bags of "pure" cement was used per cubic yard.

The general contention is, and it is supported by Mr. Steele, that the superior concrete in these two structures is the result of the more finely ground portland cement; that the interground rock was merely an inert filler or "extender." Apparently, very little is known about the chemical analysis of the cement used, but if it was like most of the western cement made at that time, it was probably what would be termed today a high alkali cement. If that were the case, is it right to reject the supposition that the interground siliceous rocks were more than inert fillers? They could have reacted to some extent with the alkalies in the cement or with their self-contained alkalies in the presence of calcium hydroxide. In other words, there was very likely some puzzolanic effect. The use of these structures as examples of 2-bag unadulterated cement concrete, it seems to this writer, is stretching conclusions farther than known factors justify.

Pulverized Rock as Dispersants

Steven Gottlieb*, a cement chemist, now with a cement company in France (Fabriques de Ciment et de Chaux R. Vigier SA.) made the following comment about our suggestion that the excellence of the concrete in Arrow Rock and Elephant Butte dams may be the result of a puzzolanic reaction of the ground rock and a high alkali cement: "It is not my intention to go into the intricate studies of alkali-aggregate reactions which may have great importance by influencing concrete either in a destructive or in a positive sense. What I would like is to draw your attention to another aspect from which, I think it would be worthwhile to review this whole problem. In this connection it would also be worthwhile to consider the possible beneficial effect on the quality of the concrete in the Elephant Butte dam from fundamentally different reasons than reactions between alkalies and siliceous additions to the cement.

"It is worthwhile to study the properties of 'sand-cement' of which R. R. Coghlan wrote some 35 years ago, when sand was sometimes interground with portland cement clinker. I also made studies of such cements eight years ago, and I found that due to the grinding action of small sized sharp sand particles, the proportion of fines in the clinker became much greater. Thus there was an accumulation of silica in the coarser grains and an increase in the surface area of the clinker particles. I was surprised to

*Author of article "Is Coarse Cement Aggregate?" *ROCK PRODUCTS*, April, 1945.

find a much greater resistance to water under pressure and to aggressive solutions with this sort of blended cement, while strengths were good and well above those required for standard portland cements. At that time I also thought of the possible reaction between the silica and free hydrated lime, with or through the intermediary of the alkalies. And how surprised I was when results were even better where a hard dolomitic limestone was interground with the clinker instead of sand as an 'extender.'

"Systematic studies followed which led to the production of a new type of 'blended cement,' the quality of which proved to be superior to the best rapid-hardening portland cements, though it contained only 60 to 70 percent clinker. The manufacturing process had two stages of grinding: (1) The clinker was ground very finely, and suitable limestone was ground to a medium fineness so as to 'replace' the coarser (40-80 μ) particles of the cement. The two grinds were blended immediately after grinding, when the extremely fine clinker still retained enough static-electric charge from the mill-work to keep its particles from agglomerating. By an intimate blend the average distance between clinker particles became greater by the even intrusion of an inert material (the limestone), having different electro-static properties. Thus subsequent hydration became more uniform; shrinkage, creep and heat evolution during hardening were lower due to the entraining of a neutral 'buffer.'

"This inert buffer also worked in a remarkable way subsequent to hydration. Because of its porosity it sucked up water from its surroundings, thus actually lowering the real water-cement ratio. After the hydrates were formed, i.e., water actually disappeared; the difference of vapor tension made the water move from the capillaries of the inert limestone, providing in this way a sort of 'inner curing' of the concrete. 'Bleeding' could be brought under control, and it was possible to produce blends which did not bleed at all. Under the microscope the structure of this sort of blended cement, hardened with water, was compared with a rapid-hardening cement similarly prepared. The latter showed many 'honeycombs' and channels, whereas the former had an even and smooth structure.

"I did not think to venture too far by accepting this difference as seen under the microscope, as a proof for a corresponding difference in durability and permanency. But later, after numerous structures had been made with this new type of blended cement, and could be kept under close surveillance, I was convinced that I was right.

"Too great specific surfaces in cement cannot be utilized without punishment, if we do not take into consideration the play of electro-static charges on the particles while produc-

ing and using 'modern' cements with extremely great specific surfaces.

"Homogeneous cements (clinker with only gypsum) seem to have their limitations, and we will have to change to heterogeneous (blended) cements if we do not want to leave the great possibilities in large surface areas unused. On the other hand, the possibility of reducing the modulus of elasticity of concrete while increasing strength is by no means a phantasy. It can be approached on the line of heterogeneity. Those research workers who say we must revert to 'old-time, coarse cements,' or those who say that cements will be completely hydrated after five years, are fundamentally wrong. For instance, I could prove that an extremely fine-ground clinker of 6060 sq. cm. per gram. specific surface (Leanurse permeability value) still had a considerable heat of hydration left when 8 years old, after being reground and rehydrated. The advantages of heterogeneous cements (that is blended cements) seem to be particularly effective where large masses or great surfaces of concrete are concerned. I think that it is rather in this direction that the excellent quality of the concrete in the Elephant Butte dam may be found."

Calcite-Portland Cement

Arne Daniels, a civil engineer in Norway who has given much study to cement and concrete, is another firm believer in the benefit to be gained by intergrinding or admixing ground calcite (calcium carbonate) with portland cement. He has obtained patents in some countries for this type of blended cement and has applied for patents elsewhere. In the United States grinding or admixing limestone with portland cement clinker to produce a plastic masonry cement has been rather common practice for several years, although not much publicized, for fear it would be termed an adulteration. However, according to Mr. Daniels, all kinds of limestone or calcite do not give the same desired results.

Mr. Daniels calls his product "calcite cement" and there is a booklet in Swedish describing it, published in Stockholm in 1948. A part of this was translated for us by Mr. Daniels, which together with graphs gives a fairly clear idea of his theory and the results of tests with such calcite cement mixtures. Incidentally, Mr. Daniels agrees with the writer that free calcium hydroxide in the hardened concrete is in some manner the cause of rapid concrete disintegration in much of recent hydraulic construction. He believes that the calcite admixture has some chemical effect in "fixing" this free calcium hydroxide, although he cannot explain what chemical reaction that could be.

Mr. Daniels says that the term "calcite," as used in the report of his research work, means "a distinct group of metamorphous calcium carbonates

with definite characteristic properties, thus not embracing limestone in general." He says: "Scientific investigations of calcite-concrete (20-30 percent of pulverized calcite replacing cement) have shown sensational properties of resistance to weathering reactions, so well known from construction in sea water—in the tidal zone. The same resistance is also proved against the reaction of sulphuric acid solution. *** In addition, calcite admixtures give a mortar or concrete of superior plasticity, a dense homogeneous mix with less water and a considerable increase in compressive strength."

The only scientific explanation Mr. Daniels has been able to obtain from geochemists is that calcite mineralogically acts to adsorb the free calcium hydroxide content of the concrete, or as our translator puts it "the calcite actually saturates [is saturated by?] the 'free lime,' thus converting the unstable component into a stable mineral substance." It is difficult to see how this could be, since presumably the adsorption or saturation is a colloidal reaction, in which both the calcium hydroxide and calcium carbonate particles would have the same positive electrical charges upon hydrolysis or ionization, and would therefore tend to repel each other.

However, it is believed that colloidal humus carried into the mix by the sand, regardless of how much washing it gets, could very well be a factor. The humus being acid (charged with negative electricity) would probably leave the siliceous particles, on which it may be adsorbed, for the calcium carbonate particles, that might then adsorb enough humus to carry a negative charge and hence adsorb calcium hydroxide. Such reactions occur in colloid chemistry.

Mr. Daniels' research is interesting because it verifies experience in the United States that the inclusion of some 20-30 percent of limestone either as fine or coarse aggregate, with an otherwise siliceous material, appears to be effective in delaying or preventing some of the reactions which cause concrete disintegration, particularly in highway pavements.

Conclusions

We have presented here three separate versions of the reason why "blended," or as some prefer "adulterated" portland cements, appear to give better results than "pure" portland cements, as they used to be specified some 40 years ago. Are these results best accounted for by chemical or physical processes? Mr. Gottlieb says it is largely, if not entirely, physical phenomena which results in better packing of the particles and better distribution of the cement. Mr. Daniels is sure there is some chemical reaction even when the admixture is a calcite and not silicious.

(Continued on page 123)

Perlite Producers Hold Convention

Standardization, specifications and merchandising discussed fully by new organization which is making excellent progress

MORE THAN 80 miners of perlite ore, operators of processing plants, engineers and guests from coast to coast attended the first national meeting of the Perlite Institute at Colorado Springs, Colo., September 7-9. The Institute was formed as a result of a meeting in Los Angeles on May 12 at which time officers and a board of directors were elected, and the objectives of the organization were established.

The perlite industry is probably the fastest growing of all the non-metallic minerals industries and, without question, is in need of organized effort in order to further its growth and development. A great deal of effort and expense had been put forth on an individual company basis thus far but it will remain for trade association activity to put the product over on a national scale through the establishment of standards, a program of technical research and aggressive promotional activity. These three objectives, as we express them broadly, are the aims of the Institute and the group, as we learned at Colorado Springs, has made excellent progress toward achievement of these goals.

There are now more than 20 members of the organization but representatives of many other companies, non-members as well as brand new concerns, came to Colorado Springs to participate in the discussions, with the result that several new members were added and others will join. They were impressed, as we were, with the freedom with which information and ideas were interchanged for the benefit of all, as brought out in informal discussion.

Being a new industry and one with enormous potentialities, the Institute likely will hold two general meetings

annually. It will meet next in Chicago, Ill., during the month of March, 1950, the place and dates to be announced later.

The first day of the Colorado Springs meeting was devoted to meetings of committees and the board of directors. Reports of the membership, publicity and technical committees and that of the treasurer were heard the second day followed by discussion. Emphasis was on the use of perlite as a plaster aggregate. The meeting concluded with informal discussion of the use of perlite in applications other than plaster, followed by a visit to the Alexander Film Co. studios and the perlite expansion plant of the film company's Alexite Engineering Division. A drawing for a U. S. Bond was held each morning at 9:30 a.m. to encourage prompt attendance. Whether the bond was an incentive or not, each session started promptly on time.

Entertainment

Entertainment included a get-together meeting around the campfire with a Chuck Wagon dinner in Colorado's famous Garden of the Gods the first night, and an informal banquet. Ladies' entertainment consisted of a luncheon at the Broadmoor hotel, golf and cards. Much of the credit for an enjoyable meeting is due J. Don Alexander, president of Alexander Film Co. and his staff, for arrangements and for providing meeting accommodations in the pent house of the Antlers Hotel.

Officers

Officers of the Perlite Institute are T. C. Carter, Great Lakes Carbon Corp., New York, N. Y., president; J. Don Alexander, Alexite Division, Alexander Film Co., Colorado Springs,

Colo., vice-president, and Wharton Clay, executive secretary-treasurer of the Perlite Institute, New York, N. Y. In addition to the president and vice-president, the Board of Directors includes Oliver N. Gregg, Gregg Lumber Co., Grand Rapids, Mich.; C. H. Hall, Standard Perlite Corp., Pasadena, Calif.; and Thomas W. Dant, Dant and Russell, Portland, Ore.

The Technical Committee comprises S. W. Johnson, Combined Metals Reduction Co., Salt Lake City, Utah; Kurt Hazelton, Cleveland Gypsum Co., Cleveland, Ohio; Gordon A. Cain, Standard Perlite Corp., Pasadena, Calif.; and H. E. Lewis, Great Lakes Carbon Corp., New York, N. Y. Dwight McClure, Great Lakes Carbon Corp., Los Angeles, Calif., is chairman of the membership committee, and Harold Mulinix, Alexite Division, Alexander Film Co., heads the public relations.

President's Address

President Carter presided over the opening session and in his keynote address, outlined the problems facing the industry and the activities to be undertaken by the Institute in meeting them.

Mr. Carter touched upon the potentialities of perlite in the building industry and the many unexplored uses which may be developed. He said that a big job lies ahead in development of markets and he emphasized the industry's responsibilities to the users in learning how to manufacture a consistently high grade product. He also stressed the need for reducing production costs in order to make the business profitable.

Mr. Carter particularly stressed the importance of aggressive and sound marketing practices in mer-



Left: Visitors inspect Alexite perlite expanding plant of Colorado Springs. Right: The expanding kiln holds interest of those present





chandising a new product, which is being introduced in a buyer's market in competition with sand, dry wall construction, premixed plasters and with other lightweight aggregates. We might add here that practically all producers of processed plaster have thus far largely marketed their material as plaster aggregate.

The industry, Mr. Carter said, must establish standards and the trade must be familiarized with the specifications. Government agencies and other groups which influence specifications must be contacted and also those agencies like F.H.A. which write standards and approve and grant loans for building on a national scale. To do the job, Mr. Carter urged that a strong organization be built.

Publicity

An aggressive program of publicity is planned. One of the first objectives is preparation of standards for use in merchandising by individual members. An exhibit was being planned for the Conference of Building Officials to be held in Washington, D. C., this month. News releases will be prepared for presentation to trade magazines and Mr. Mulnix urged that good job articles be made available to the Institute's office for use in preparing publicity. In the discussion following the report, it was mentioned that perlite plaster has been used for fireproofing steel members in the congressional chambers in Washington. Another interesting job pointed to was the use of plaster with perlite as aggregate in a housing development in Colorado Springs with individual homes in the \$6800 price class. Speed of application with perlite plaster was a factor in landing that job.

Technical Report

The technical committee was extremely active and held several lengthy meetings. H. G. Lewis presented the report which largely covered packaging, performance standards and specifications. One of the immediate objectives is to have specifications for perlite aggregate covered in the A.S.A. plastering standards which are soon to be re-written. The proposed specification for sieve analysis would differ from the A.S.T.M. requirement for sand now in effect only by increasing the percentage passing a 100-mesh sieve from five to ten percent. As to density, the recommendation to be made will be a modification from the minimum of $7\frac{1}{2}$ lb. down to 6 lb. per cu. ft. and lowering of the maximum

LEFT:

- (1) J. Don Alexander, president, Alexite Engineering Division, and vice-president of the Perlite Institute, with his constant pal, Ricky. (2) H. Ellerbeck, Salt Lake City, Utah, foreground, and Wharton Clay, executive secretary-treasurer smoking his corncob in background.
- (3) C. W. Taylor explains procedure of Alexite Engineering Division laboratory.
- (4) J. A. Green, Alexite Engineering Division, answering questions on laboratory field trip.
- (5) Vern Cheever, Alexite Engineering Division, seems to be a good listener

from 15 lb. to 12 lb. At present, the industry will go along with mix ratios as written for vermiculite aggregate but proposes to undertake tests which likely will make it desirable to change the mix ratios at a later date.

The committee, in its consideration of packaging, is in favor of standardization in order to guarantee amount, and that subject will be given further study.

Thermal and acoustical tests are under consideration for purposes of standardization inasmuch as there thusfar has been much costly duplication by individual companies. The committee aims to have single tests made which will be available to each member and recognizes the desirability of having all-purpose fire tests conducted which will cover rating requirements everywhere. Great Lakes Carbon Corp. has had fire rating tests made, using its product, which Mr. Lewis said will be made available.

Mr. Lewis resumed his discussion in the following meeting under the chairmanship of Mr. Gregg, covering acoustical properties, sound transmission and wall transmission. One point brought up in discussion was the desirability of using different densities of perlite for the separate coats in three-coat plastering. Much discussion developed on the subject of standardization of packaging which, it was agreed, was desirable. A poll indicated that, with one exception, the industry was standardizing on a 4-cu. ft. bag.

Several plastering contractors who were invited to attend the meeting gave their experiences with perlite plaster. They are finding the product very acceptable. Guy Barnett, plastering contractor of Amarillo, Texas, has been specializing in perlite plaster for three years and expressed his enthusiasm for its properties and performance. He reported that there have been no cracks in any of his jobs and he credited this performance to the aggregate. Mr. Barnett does not believe in using the aggregate with anything but gypsum plaster and believes that all jobs should be three coat.

Perlite for Concrete

Apparently very few companies have sold or used perlite as concrete aggregate with the exception of the Precast Slab and Tile Co., St. Louis,

RIGHT:

- (1) President T. C. Carter, New York, N. Y., left, with Frederick Stroh, counsel for the Institute, New York City. (2) Victor R. Docken, left, and V. M. Samuels, both of newly-formed Ponacalite Perlite, Kansas City, Kan. (3) Mr. and Mrs. William J. Geary, Sausalito, Calif., examining specimens of ore. (4) Left to right: Harry E. Lewis, New York, N. Y., and E. E. Swift and L. H. James, Phoenix, Ariz. (5) Executive secretary-treasurer Wharton Clay, left, at speakers' table with director O. H. Gregg, Grand Rapids, Mich. (6) E. F. "Dix" Dillon, Colorado Springs, left, with E. E. Swift, Phoenix, Ariz. (7) J. Don Alexander, right, poses with research expert Elmer Zost of Alexite Engineering Division. (8) T. Coleman Ward, Jr., Carnegie, Penn., left, with President T. C. Carter





F. S. Strickland, Albuquerque, N. M., expresses interest in laboratory procedure. In background are Robert Cornish, New York City, left, and J. Don Alexander.

Mo., which has built up a very extensive volume of business in that field. There was great interest in a talk on perlite concrete aggregates by J. John Brouk of that concern, since the field of concrete offers opportunity of greatly enlarging markets for perlite.

Precast Slab and Tile Co. manufactures precast channel section floor and roof slabs and ships them as far as 1000 miles by rail. Formerly specializing in Haydite units, with vermiculite topping, a perlite expanding plant was built in 1947. Much lower water-cement ratios, by as much as 30 to 40 percent, are feasible with a given cement content, with perlite, said Mr. Brouk. Reduced shrinkage and quicker hardening of perlite topping were other advantages observed.

The company is blending 6-10 lb. perlite aggregate with natural sand and has been able to produce structural lightweight concrete of 2500-3000 p.s.i. compressive strength (28 days) in the 90 lb. per cu. ft. weight classification. Vinsol resin is used as an air-entraining agent. Some work has been done in manufacturing load-bearing concrete masonry units and Mr. Brouk believes a blend of perlite and sand has possibilities on this application. Breakage and consequent high cement factor have made it impractical to produce machine-made concrete units thus far.

The company has sold some perlite refractories for use under temperatures up to 2000 deg. F. and believes a sizable market for refractories can be developed.

Frederick G. Stroh, Counsel, New York, N. Y., commented briefly on legislation of interest to the industry, and Wharton Clay, executive secretary-treasurer, presented a progress report covering activities of his office. Mr. Clay has already made a western trip and, he said, the industry needs to develop more volume of business in many areas and more control of manufacture in order to build profitable business. Mr. Clay presented a chart, showing a formidable number of agencies which influence specifications, grant loans and influence sales for building which the Institute intends to contact. Already many of

them have been called upon. Offices of the Perlite Institute are at 35 West 53 St., New York 19, N. Y.

Registration

Don Alexander Jr., Alexite Engineering Division, Alexander Film Co., Colorado Springs, Colo.
 J. Don Alexander, Alexite Engineering Division, Colorado Springs, Colo.
 John A. Baker, Alexite Engineering Division, Colorado Springs, Colo.
 C. T. Baker, Magdalena, N. M.
 Guy N. Barnett, Plains PerAlex Co., Amarillo, Tex.
 C. J. Barnhisel, New Mexico Mining & Contracting Co., Albuquerque, N. M.
 Gene Black, Midwestern Perlite Corp., Oklahoma City, Okla.
 J. John Brouk, Precast Slab & Tile Co., St. Louis, Mo.
 A. L. Burkett, Breckenridge, Colo.
 House Butler, Macatee, Inc., Dallas, Tex.
 Gordon A. Cain, Standard Perlite Corp., Pasadena, Calif.
 T. C. Carter, Great Lakes Carbon Corp., New York, N. Y.
 A. R. Chandler, U. S. Perlite Co., Los Angeles, Calif.
 Vern Cheever, Alexite Engineering Division, Colorado Springs, Colo.



Contractor Guy Barnett of Amarillo, Texas, left, and Carl F. Sheaff, Akron, Ohio, perlite producer

Wharton Clay, Perlite Institute, New York, N. Y.
 Robert Cornish, Great Lakes Carbon Corp., New York, N. Y.
 Victor R. Dacken, Panacalite Perlite, Kansas City, Kan.
 M. C. Dailey, U. S. Gypsum Co., Chicago, Ill.
 E. E. Dillon, Alexite Engineering Division, Colorado Springs, Colo.
 Henry I. Dutton, Perlite & Cement Block Co., Edgemont, S. D.
 Ray Ebeling, Alexite Engineering Division, Colorado Springs, Colo.
 H. H. Ellerbeck, UTCO Products Co., Salt Lake City, Utah
 Wm. P. Ewing, Hutchinson PerAlex Inc., Hutchinson, Kan.
 O. H. Freudenberg, Persolite Products, Inc., Denver, Colo.
 William J. Geary, Perlite Products Co., Sau-salito, Calif.
 O. H. Gregg, Gregg Lumber Co., Grand Rapids, Mich.
 J. A. Green, Alexite Engineering Division, Colorado Springs, Colo.
 Corydon H. Hall, Standard Perlite Corp., Pasadena, Calif.
 Harry Hammon, Los Angeles, Calif.
 Bill Hanson, Hot Springs, S. D.
 George Hanson, Hot Springs, S. D.
 Melvin Hanson, Hot Springs, S. D.
 Chas. A. Haskell, Research Counsel, Inc., Denver, Colo.
 T. Hashimoto, Research Counsel, Inc., Denver, Colo.
 Kim E. Hazelton, Cleveland Gypsum Co., Cleveland, Ohio.
 R. G. Hemingway, Alexite Engineering Division, Colorado Springs, Colo.
 W. H. D. Hinman, The Hinman Corp., Detroit, Mich.
 W. H. Hawk, Rushmore Perlite Products, Rapid City, S. D.
 O. L. Hough, Research Counsel, Inc., Denver, Colo.

L. H. James, Western Perlite Corp., Phoenix, Ariz.
 Halk Jarrett, Midwestern Perlite Corp., Dallart, Tex.
 S. W. Johnson, Combined Metals Red. Co., Salt Lake City, Utah
 Butrice E. Jones, Plastering Industries, Colorado Springs, Colo.
 Park Kelley, Ozark Mahoning Co., Tulsa, Okla.
 J. C. Kingsbury, F. E. Schundler Co., Joliet, Ill.
 Ernest Kretschmar, Texas Perlite Corp., Ft. Worth, Tex.
 E. L. Kroon, Johnston Mfg. Co., Minneapolis, Minn.
 P. M. LeBaron, Great Lakes Carbon Corp., Albuquerque, N. M.
 Harry E. Lewis, Great Lakes Carbon Corp., New York, N. Y.
 Patrick C. Lipscomb, The Trillite Corp., Houston, Tex.
 Lee E. Logan, Magdalena, N. M.
 John P. Lowe, Southwestern Engineering Co., Los Angeles, Calif.
 A. J. McDaniel, Maceo Perlite Inc., Houston, Tex.
 H. J. McMichael, Stearns-Roger Mfg. Co., Denver, Colo.
 Robt. H. Morris, American Builder, Chicago, Ill.
 Harold Muñiz, Alexite Engineering Division, Colorado Springs, Colo.
 John Murdock, The Perlite Corp., Tempe, Ariz.
 Lewis Nicolls, Roy Burkett, Albuquerque, N. M.
 Bron Nordberg, Rock Products, Chicago, Ill., III.

H. W. Parsons, Research Counsel, Inc., Denver, Colo.
 Kenneth Fierce, Hot Springs, S. D.
 Dexter H. Reynolds, University of New Mexico, Albuquerque, N. M.
 V. M. Samuels, Panacalite Perlite Inc., Kansas City, Kan.
 F. E. Schundler, F. E. Schundler & Co., Joliet, Ill.
 H. O. Schundler, F. E. Schundler & Co., Joliet, Ill.
 Gustavus Sessinghaus, Mining Engineer, Denver, Colo.
 Carl F. Shoaff, J. P. Loomis Co., Akron, Ohio
 F. S. Strickland, Insulation Service Co., Albuquerque, N. M.
 Frederick G. Stroh, Counsel, New York, N. Y.
 E. E. Swift, Western Perlite, Phoenix, Ariz.
 C. W. Taylor, Alexite Engineering Division, Colorado Springs, Colo.
 C. B. Van Dorn, Denver, Colo.
 T. Coleman Ward, Jr., Perlite Mfg. Co., Carnegie, Penn.
 J. B. Wells Jr., Southwestern Engineering Co., Los Angeles, Calif.
 Bob Wilfley, Alexite Engineering Division, Colorado Springs, Colo.
 John W. Weller, New Mexico Mining & Contracting Co., Albuquerque, N. M.
 W. Wadsworth Wood, Small Home Guide, Chicago, Ill.
 C. L. Worley, Morrison-Merrill & Co., Salt Lake City, Utah
 Elmer Zost, Alexite Engineering Division, Colorado Springs, Colo.

Nevada Fluorspar

"THE DAISY FLUORSPAR DEPOSIT NEAR BEATTY, NYE COUNTY, NEV." has been released as Strategic Minerals Investigations Preliminary Report 3-209 by the U. S. Geological Survey. The Daisy fluorspar deposit consists of nine claims on the north slope of Bare Mountain near Beatty. The claims are in an area of folded and faulted Paleozoic sedimentary rocks, and the fluorspar deposits occur in limestones as fissure filling and as replacement deposits in faults and associated structures. In 1946 the reserves in this area were estimated at nearly 100,000 tons of fluorspar averaging about 75 percent CaF₂. Copies of the report may be obtained from the Director of the Survey, Washington 25, D. C.

Opens New Quarry

THE BAKER'S QUARRY organization which operates at Kahoka, Mo., has placed a new quarry in operation near Clark City, Mo. It is said to contain approximately 4,500,000 tons of limestone.

COLLECT DOLLARS WITH **SLY** DUST FILTERS

BENEFIT BY SLY'S GREATER COLLECTING EFFICIENCY

This is a typical Sly installation. Literally, hundreds of similar installations are in use in connection with production of cement, crushed stone, agricultural limestone, gypsum, asbestos, talc, feldspar, fluorspar, gold, copper and iron ore, diatomaceous earth, bauxite, etc.

Sly Dust Filters collect dust generated in such operations as crushing, grinding, screening, conveying, loading, separating, and mixing—Saving valuable materials, adding to net income.

Sly Filters are saving money for their users by providing cleaner plants, better working conditions, greater production, less cleaning up (interiors, roofs, surroundings, etc.), and cleaner products, which sell better. Thousands of installations.

NOT EXPENSIVE — SLY FILTERS SOON PAY FOR THEMSELVES

Sly Dust Filters get all the dust by filtration through cloth. They offer you:

1. Greater filtering capacity because of more filtering cloth.
2. Taut bags (patented) save power and improve dust removal.
3. Bags more easily replaced.
4. Automatic control (any degree) minimizes or entirely removes the human factor.
5. Simpler shaker mechanism results in savings in maintenance and operation.

IN BRIEF, THEY PROVIDE FAR GREATER
COLLECTING EFFICIENCY



SEND FOR REVISED BULLETIN 98

Packed full of helpful information on dust control — photographs of installations, data on installations, etc. Tell us your problem so that we can write you fully. Benefit by the savings we can offer you.



Illustration above shows a Sly Dust Filter in the pack house of a cement plant. Several dust pipes enter the fan side of the filter. The exhaust fan is located on the floor below the filter. A screw conveyor automatically and continuously removes the collected cement.



Sly Dust Filter in a rock crushing plant. Hundreds of plants in this industry are realizing better profits by using Sly Filters.

PIONEERS AND LEADERS
THE W. W. SLY MANUFACTURING CO.

4746 TRAIN AVENUE • CLEVELAND 2, OHIO
NEW YORK • CHICAGO • ST. LOUIS • PHILADELPHIA • DETROIT • MINNEAPOLIS
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CEMENT INDUSTRY IN GERMANY

Cement manufacturers have been through trying times. Coal and power supply are the chief operating obstacles today

IN THIS ARTICLE we will attempt to point out the conditions under which the German cement manufacturer has operated during the last four years following the end of World War II. Conditions in that part of Germany which is occupied by the three western powers are primarily dealt with, since all information from the other side of the iron curtain, the zone occupied by the Russians, is very scarce and to be taken with utmost caution.

When firing ceased in war-torn Germany, its cement industry found itself in a rather crippled but not hopeless condition. Fortunately, cement plants were not as severely hit or destroyed by military action as some other industries; however the long years of war with manpower curtailed and insufficient opportunities for replacing and repairing worn-out equipment, made it mandatory for most plants to be thoroughly overhauled to bring them back to pre-war time condition.

With the beginning of the occupation, the cement plants were taken over by the military forces and the stocks on hand requisitioned for army construction jobs. At the same time, the plants were ordered to resume operation. The difficulties were generally very numerous, the chief one being the complete breakdown of all transportation and communication facilities. Most of the bridges were blown up and the mail communications did not function at all. Furthermore, there were no trucks or passenger cars, no tires and gasoline available. Only with the help of the transport equipment of the occupation forces was it possible to obtain only the most essential necessities to start operation again.

Supply Situation

The relatively small stocks of paper bags, which were used almost exclusively for the shipping of cement, were soon exhausted. The cement manufacturer, with no means to obtain new bags, was forced to search for scattered supplies of cellulose, transport it to the paper mills, furnish the mill with coal so that they could resume operation, transport the paper to the bag manufacturer and finally haul the bags to his plant. All this had to be done by personal trips, since no mail or telephone service was available. The quality of the paper was much inferior to pre-war bags, since very little Swedish cellulose could be

By DR. ALFRED E. BEITLICH*

obtained. With a high percentage of sulfite cellulose, the bags broke at the packing machines and during the following transport to the job, especially during the hot summer season.

The following item may serve as another illustration of the many difficulties. A plant in Southern Germany was without raw gypsum. So, a convoy of six 5-ton army trucks communicated daily for several months between the gypsum quarry and the cement plant, making a round-trip of nearly 80 miles each day, until the rail lines and bridges were open to traffic again.

One of the major problems of the cement producer was to get coal to his plant. Pre-war, most of the coal traffic was directed over the extended waterway system of German rivers and canals. With the bridges and the locks a heap of broken concrete in midstream and most of the coal barges grounded, there was not a chance for water-transportation for many months to come. Every ton of coal had to be shipped by rail over a hopelessly crippled railroad system.

Tremendous efforts were made to increase coal production, but there continued to be a severe shortage of this important commodity. The power situation was just as bad. The German consumer of electric power was cut off from the water-power plants in Austria and had to rely almost exclusively on power plants operated by coal which was scarce. Besides there were few power plants left at the end of the war which could be put into operation without extensive repairs.

But somehow, in spite of tremendous odds, smoke started to come out of the stacks of most cement plants in the summer or Fall of 1945. Then another severe shock threatened to paralyze the struggling German industry. The newly established laws concerning the abolition of National-Socialism and militarism called for immediate dismissal from employment of all persons, who were in some way or other connected with the Nazi party or of higher military rank. Since this affected mostly management and men in leading positions, the plants were almost over-night left without many of their managers, engineers and trained supervisors. Men without any political or military connections moved in to fill the vacancies, but not without seriously endangering the proper func-

tioning of the industry. Furthermore the cement plants, like any other industrial enterprise, were strongly handicapped by the shortage of manpower. There was hardly a working man of less than 45 to 50 years of age and all of them were undernourished and worn-out by the war years when they worked 72 hr. and more each week. The younger and healthier men were still in prisoner-of-war camps. This condition improved only very slowly.

Material Shortages

As time went on, production figures began to rise and with this rise the demand for spare parts and replacements increased. Most of the large producers of heavy cement mill equipment were located in the Russian zone and therefore were no longer available. While, in former times a wire was all it took to order spare parts, now the cement manufacturer had to take his machinery apart, make drawings, hunt up the right kind of lumber for the making of patterns and had to have castings made and machined. Every stage of this tedious process took months. It was almost impossible to obtain steel or any other metal that is used in cement manufacture. Inferior types of steel had to be used to line cement grinding equipment, causing innumerable shutdowns and repairs. With no ball bearings on hand, entire sections of plants had to be redesigned and fitted with friction-type bearings. There was a shortage of lubricants, explosives, refractories, rubber conveyor belts, leather belts, lumber, roofing tile, tar paper, nails, window glass, electric motors, light bulbs and even rags for cleaning purposes. The only thing left was the tremendous willpower to get up again.

Due to their scarcity, all materials fell under the rationing system. The filing of application blanks for their procurement became a routine task. Since the demand always exceeded by far the small supply, it became almost impossible to get anything at all. Furthermore, the producer of any kind of commodity became more and more reluctant to sell his products in exchange of German Reichsmark. The situation finally developed so that one could only buy goods if he was able to offer some other goods in return. Officially, this sort of barter of rationed commodities was strictly prohibited, but it soon assumed such proportions that the practice could not

(Continued on page 128)

*Chief Chemist, Portland-Zementwerke, Heidelberg, Germany.

Facts you should know

about the New General Motors Diesel Engine-Torque Converter Unit



Two 190 H.P. 6-Cylinder GM Diesel Engine-Torque Converter units power the new 34-ton Euclid 1-FFD tandem axle rear-dump. Each engine drives one rear axle, eliminating the conventional inter-axle power divider. A 3-speed Allison Toromatic transmission, designed for the use of pedal and manual shifting. Designed for off-the-highway haulage of large tonnage, the mammoth 1-FFD has a top speed of 25.4 m.p.h. with full pay load.

ONE MANUFACTURER The new torque converter is specifically designed and manufactured by General Motors as an integral unit with the Series 71 two-cycle Diesel engine. Result: a big saving in size and weight—no compromise designs—no divided responsibility.

AUTOMATIC SHIFT FROM TORQUE MULTIPLICATION TO FLUID COUPLING

at stall speed to 1-to-1 torque ratio in fluid coupling. Unit goes into fluid coupling whenever load requirements equal engine torque, without regard to output shaft speed.

MORE WORK IN LESS TIME

This new power unit gets the most work done in the least time. Because it is not rigidly geared to the load, the engine responds to the throttle and immediately accelerates to a high output range regardless of the speed of the load.

FREEDOM FROM SHOCK LOADS

Transmission of power through a liquid cushion both engine and

driven machinery from sudden shock loads. Operation is liquid-smooth (free from jerks) at any speed or throttle setting.

FREEDOM FROM STALLS WITH OVERLOAD

Fluid circuit prevents engine stalling under any load condition. Ability to exert a smooth pull at any output shaft speed down to zero permits GM Converter-equipped machines to do some operations that are impossible with conventional units.

EASE OF HANDLING Eliminates time lost in unnecessary low gear operation. Operator fatigue is reduced. Work is speeded up with less effort on the part of the operator.

WIDE RANGE OF MODELS

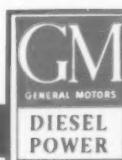
The new GM Diesel Engine-Torque Converter unit is made available in 3-, 4- and 6-cylinder single engine units, Twin 4 and Twin 6 multiple engine units with engine ratings from 64 to 294 H.P. to meet a wide range of power requirements. Write or wire for full details.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES... Up to 200 H.P. DETROIT 28, MICHIGAN MULTIPLE UNITS... Up to 800 H.P.

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK



Pennsylvania Agstone Producers Meet

Interpretation of Purchase Order Plan for 1950, value of magnesium in soil fertility, main topics discussed

AGRICULTURAL LIMESTONE DIVISION, Pennsylvania Stone Producers Association, met July 15 at the Hotel Penn-Harris, Harrisburg, Penn., with approximately fifty in attendance. Chairman F. Edward George presided and reviewed accomplishments of the group since its organization a few years ago. Its primary aim is advertising and promoting the sale of agricultural limestone, and this has been accomplished through newspaper ads, display signs and different leaflets, all of them advocating the use of agricultural limestone.

The first speaker was Dave Shroyer, who gave a report on the committee meeting conference that was held with the State Production and Marketing Administration. At that meeting operation of the Purchase Order Plan as far as the legal aspects were concerned was interpreted. The interpretation for the movement of fertilizer has been more or less liberal, and the farmer is allowed to buy from the dealer of his choice and pay the difference out of his pocket, he said. This is not true where liming materials are concerned under a new interpretation. The new interpretation would require the farmer to take the material from the producer who had the lowest quotation posted in the County Office. This obviously is not the best method because the producer having the lowest price may not have the type material which the farmer needs to do his job to fill his need. It was brought out that when the initial application of lime was made to depleted soils, any type of lime would be helpful. However, as the soil is brought back into productivity, the need for special types of lime may be needed in order to meet the requirements of bringing it up to the proper soil fertility. In some cases, the higher price material may really be the cheapest because it corrects the soil condition.

Service is also a definite factor that has to do with a figure of price, and, in many cases, the farmer never getting the material as he wanted it and when he wanted it also enters the picture. And a product that may even cost 50c, \$1 or even \$2 a ton more may be cheaper than the low price product which would keep him waiting beyond the time of his immediate need.

Later, an interpretation was sent to the speaker from Washington stating "Where the person authorized to fix fair prices determines that particular service is available through local trade channels at fair and reasonable

prices in relation to cost, normal profit or margin and other factors, the fair prices for such material or services may be the prices agreed upon by the producer and the vendor. In such cases, the purchase order shall be issued showing only the amount of government contributions towards the cost of the material or services and the vendor shall insert the fair price at the time the purchase order is filled."

Magnesium and Soil Fertility

Dr. H. R. Albrecht, head of Department of Agronomy at State College, reported on the activity of his Department, briefly outlining the course the work is taking after which Dr. J. E. Steckel, of the State College, discussed the research program designed to determine value of magnesium in soil fertility. "We are finding the need of magnesium more and more important in the fertility program in the state," he said, "because magnesium is one of the important constituents in chlorophyll, the green coloring matter in plants. In the past 4 or 5 years there has been a magnesium deficiency in state soils and we should never lose sight of the fact that since we do have rather extensive dolomitic limestone in the State it may be wise to consider a program to correct this low level of magnesium that we find in the soil." Dr. Steckel said there are two reasons for this low magnesium level. Plants naturally do not remove as much magnesium as they do calcium. The more important reason is that both calcium and magnesium leach out of the soil due to the rainfall on them. The ratio due to leaching is about 4 to 1 times as much calcium leeches out as magnesium. "Does that mean that we have to lime the soil more often? In the liming program where we use low magnesium stone, of course, over a long period of years, we drain the magnesium in the soil in that it is not replenished, and leaches out." He showed pictures of experiments being carried out by the State College which all point to the fact that the easiest way to correct magnesium deficiency in the soil is to add sufficient magnesium to bring it up to proper level. And the easiest way to do this and probably the most economical way to do this thing is through the use of dolomitic limestone, or other magnesium correctives, he said.

In a question and answer period following presentation of this subject, a high calcium producer made the

statement that five State Agronomists were making careful study of the magnesium requirements and that the report will be made at the end of the year. In the light of the findings of these agronomists it was pointed out that it might be well for a high calcium producer to use certain additives in order to take care of the magnesium requirements and give full recognition to the findings of these agronomists.

Roland Crumpler discussed the operation of the contract and purchase order plan under the 1950 program, and said in part: "I shall state what we in the Washington office consider to be the rules that should be followed in operation of the purchase order plan. The main point of difficulty is how you shall set a fair price for buying this material under the purchase order plan. Under the Act, the Secretary of Agriculture may promulgate certain rules for making liming materials available under the purchase order plan or by contract, and these rules shall govern the fair price structure which is to be arrived at. The solicitor of our Department advises us and held constantly that the Secretary must prescribe a method of setting the fair price and when a purchase order is issued for a material, that a fair price must be established for that transaction. What we propose briefly is that on the purchase order to be issued that we indicate the amount of money that the government would pay towards the cost of material covered by the purchase order, and would pay that amount regardless of how much more the farmer has to pay to secure his material. We would give a farmer a purchase order which shows on it the amount of government contribution to the cost of his material. He would therefore take it to any dealer of his choice, next arrange for the best total price possible for the material authorized and would use that purchase order to the extent of the money value of the cost which he was able to arrange for.

"This liberalization, however, will not become effective during the balance of the 1949 program and probably not during 1950. In carrying out the present regulations, it is our duty to solicit quotations from all the sources and dealers within the area. In making a fair price under the purchase order plan, we will take the lowest price or prices at which a supplier or suppliers will furnish the necessary

(Continued on page 130)



"Easiest to Change Cloth ... Has Largest Capacity"

THAT'S THE ENTHUSIASTIC statement of Mr. Gilman Carter, of Twin States Sand & Gravel Co., West Lebanon, N. H., about this 4 x 10 ft double deck *Ripl-Flo* screen.

Used for sizing and washing crushed gravel and sand, this Allis-Chalmers vibrating screen produces 100 TPH of accurately graded products—sometimes feed runs to 150 TPH.

It's loaded to capacity constantly. Yet, after three years' operation, the only repair has been replacing rubber strips for supporting screen surfaces.

Changing or tensioning screen cloth is done quickly, by means of clamping plates conveniently located on outside of screen body — easy to get at.

Ripl-Flo screen's true circular motion to every part of screen surface results in rapid stratification, with no "dead" spots anywhere on cloth area. That's why, size for size, you'll get top screening capacity with this screen.

CHECK THESE RIPL-FLO FEATURES

- Has only two bearings to lubricate instead of four.
- Offers 17% less width; as much as 36% less weight than comparable screens.
- Adequate support for screen surfaces increases cloth life.
- Simplified design reduces maintenance, power, initial costs.
- Sizes 3x6 to 6x16 ft; 1 to 4 decks.

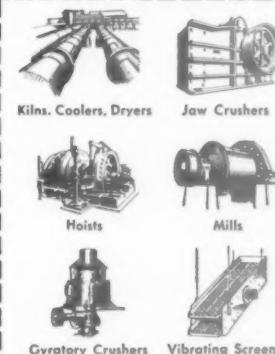
Get in touch with the Allis-Chalmers representative in your area for more facts about *Ripl-Flo* screens. Or write for Bulletin 07B6151B. A-C offices or distributors are in principal cities in the U.S.A. and throughout the world.

Ripl-Flo is an Allis-Chalmers trademark.

ALLIS-CHALMERS, 975A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

A2839



AND OTHER EQUIPMENT
FOR THE CRUSHING, CEMENT
AND MINING INDUSTRIES



(Continued from page 93)

overflow from this unit is wasted and is all finer than minus 200 mesh.

The sand from this machine falls to the 12-in. screw conveyor that

serves several purposes in that it is the collecting point for the fine aggregates, be they from the pit, the cone crushers, or returns from the Symons screen in the final screening

section. The screw conveyor also acts as a feeder for the ball mill and here again it serves a multiple purpose, for the discharge opening of the screw is provided with another flop gate so that part of the sands from the screw can go direct to the Hardinge mill and the remaining portion can go direct to the first of the 36-in. spiral sand machines. That portion going to the ball mill falls to the scoop feeder of the Hardinge mill and passes through the grinding unit. The ball mill is loaded with 25,000 lb. of pressed steel balls and 2000 lb. of punchings. The mill is driven by a 150-hp. motor that operates at 900 r.p.m. through a 70-in. (P.D.) sheave on the pinion shaft, and a 13.8-in. (P.D.) sheave on the motor along with the ring gear and pinion drives the mill at 24.7 r.p.m. This is 73.3 percent of its critical speed. The mill is lined with manganese steel liners but liner wear has not been determined as the machine has not been in service long enough to give a reliable figure; however indications are that the wear is nominal and comparable with standard ball mill practice. Every other day, fifty 3-in. dia. steel balls are fed to the mill through its discharge trunion. This amount of grinding media is calculated to keep the ball load in the mill constant. These balls weigh 4 lb. each so an indicated 100 lb. of balls per day are used. On the basis of 18 t.p.h. fed to mill consumption of grinding balls is 0.7 lb. per ton ground. Grinding media are supplied by the Colorado Fuel & Iron Co., Denver, Colo. The mill operates only 8 hr. per day.

In one test that is indicative, the ball mill feed was all minus 4 mesh and had an F.M. of 3.88 and 30 percent was minus 16-mesh with 5 percent minus 50-mesh. The ball mill discharge was at 72 percent solids and had an F.M. of 1.84 of which 86 percent was minus 16 mesh. The rate of feed to the ball mill was 18 t.p.h. and the mill was operating in open circuit. The sp. gr. of the ball mill discharge was 1.820.

The details of the screen analysis of the feed and of the discharge were as follows:

Screen Size No.	Ball Mill Feed	Ball Mill Discharge
4	100	100
8	65.3	97
16	30.6	86
30	9.8	63
50	4.3	42
100	1.7	28
F.M.	3.88	1.820

The Hardinge mill is located between a 36-in. Wemco sand machine and a 48-in. similar machine. The 48-in. machine is at a higher elevation than the 36-in. unit. The ball mill discharge is split about 50-50 between the two sand machines and the relative amount sent to each machine is controllable through another flop gate. The half portion going to the 36-in. machine flows to it by gravity with fresh water being added to the pulp at the ball mill discharge.

(Continued on page 131)

Weight of sample: 1000.4 gm.

Sample No. 1

Screen Size	Accum. Weight Retained gm.	Accum. Percent Retained	Percent Passing	
			Sample	Specs.
No. 4	12.9	1.3	99.7	
8	182.9	18.3	81.7	
16	498.3	49.8	50.2	
30	814.1	81.4	18.6	
50	942.8	94.2	5.8	
100	982.5	98.2	1.8	
			Fineness Modulus	3.43

Weight of sample: 758.3 gm.

Sample No. 2

Screen Size	Accum. Weight Retained gm.	Accum. Percent Retained	Percent Passing	
			Sample	Specs.
No. 4	7.9	1.0	99.0	
8	136.0	17.9	82.1	
16	394.9	52.1	47.9	
30	591.5	78.0	22.0	
50	688.1	90.7	9.3	
100	729.5	96.2	3.8	
			Fineness Modulus	3.36

Weight of sample: 802.8 gm.

Sample No. 3

Screen Size	Accum. Weight Retained gm.	Accum. Percent Retained	Percent Passing	
			Sample	Specs.
No. 4	7.8	1.0	99.0	
8	113.1	14.1	85.9	
16	345.8	43.1	56.9	
30	598.3	74.5	25.5	
50	739.7	92.1	7.9	
100	786.9	98.0	2.0	
			Fineness Modulus	3.23

Weight of sample: 642.0 gm.

Sample No. 4

Screen Size	Accum. Weight Retained gm.	Accum. Percent Retained	Percent Passing	
			Sample	Specs.
No. 4	1.0	0.2	99.8	
8	51.8	6.1	91.9	
16	106.0	16.5	83.5	
30	275.5	42.9	57.1	
50	429.5	66.9	33.1	
100	558.3	87.0	13.0	
			Fineness Modulus	2.22

Weight of sample: 621.7 gm.

Sample No. 5

Screen Size	Accum. Weight Retained gm.	Accum. Percent Retained	Percent Passing	
			Sample	Specs.
No. 4	5.7	0.9	99.1	95-100
8	66.7	10.7	89.3	80-90
16	204.1	32.8	67.2	55-75
30	376.0	60.5	39.5	30-60
50	497.0	79.9	20.1	12-30
100	569.0	91.5	8.5	3.5-10
			Fineness Modulus	2.76
			Limiting F.M.	(Specifications)
			From 2.40	To 2.90

Screen analyses of concrete aggregates. Samples were all taken from the aggregate plant of the same time on the same day. Sample No. 1: Natural sand from No. 1 classifier. Sample No. 2: Natural sand plus cone crusher material from screw conveyor ahead of ball mill. Sample No. 3: Material from No. 2 classifier, a blend of natural sand, cone crusher material, and ball mill material. Sample No. 4: Material from No. 3 classifier, fine material from ball mill. Sample No. 5: Final product, a blend of materials from No. 2 and No. 3 classifiers.

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Labor Relations

(Continued from page 71)

The insurance company would tell him that in order for him to have a \$125 pension he would have to put up the whole \$19,870.

"The point is that to have money to spend in a non-productive period someone must first have accumulated the money. This makes starting of a pension system a quite different financial matter from that of keeping it going after it has been operating on a sound basis for a long time."

Dangerous Precedent

The board's summary of report on the matter of pensions, says: (a) The board holds that pensions are bargainable—not under the contract [the present contract between the companies and the union, which expires next Spring] but under the Taft-Hartley law [which the President and the union did their best to have repealed!]."

"(b) It recommends that pension plans be set up, to cost a little more than half as much as the union has requested, to provide (when added to the average old age government pensions) about \$100 per month. This is substantially higher than the non-contributory pension plans now in effect in the industry.

"(c) It recommends that the plans be paid for by the employer, i.e., non-contributory.

"(d) The great trend in recent years in pensions and in social insurance is toward noncontributory plans.

"(e) Since the problems and details of pensions are so much more complicated than social insurance, the board recommends that a joint study be made by the industry and labor on pensions as a prelude to collective bargaining as to the many details which have to be worked out by agreement. The study should be completed by March 1, 1950."

In brief, the board has subscribed to the same kind of baloney that has been fed union members by their leaders, that they can get something for nothing. The two statements, that of Mr. Voorhees and that of the board, clearly show the crux of the issue: Is it going to be possible for the members of the steel workers' union and you and I and everyone else to remain free and independent citizens? Or must we be wards of a totalitarian government, which eventually will go broke for want of the incentives to produce wealth that only free and independent citizens possess? If steel workers are to have no responsibility to provide for themselves, how can they expect other workers to provide for them? And who is going to provide meat and potatoes—and deep freezers—for the government's employees who merely print money?

Metallurgical Lime

(Continued from page 87)

Martin Machinery Co. of Knoxville. The centers on the elevator are 56 ft.

Discharge from the elevator is split and drops by gravity to two Allis-Chalmers 4-ft. by 10-ft. Vibra-flow screens. Provisions have been made for the installation of two additional screens at some future date. A counter-weighted horizontal gate is provided at the bottom of the screen feed chutes to assist in getting an even distribution of the material at the back of the screening surface.

Oversize from the screens is collected in a common chute and returned to the crusher or to the gravel bin for building stone and road stone, or for regrinding in one unit of old plant. The fines, minus 10-mesh are collected in a common chute and dropped onto an 18-in. belt conveyor running lengthwise over the top of a long storage shed.

The entire pulverizing and screening facilities are housed in a totally enclosed steel structure. Care was taken in the design of the screen house to assure that there would be ample room at all levels to move about, and to repair and service all equipment.

The plant was designed by L.I.M.E. engineers, who also prepared the sketches reproduced herewith to show the quarry and plant arrangement.

An article published in the May, 1942, issue of *ROCK PRODUCTS*, p. 36, described in detail the plant operations as enlarged at that time, and also the merchandising practices.

Blending

(Continued from page 99)

hopper bins of 25-eu. yd. capacity each. Six dump trucks, a 3-ton Federal, 2-2½ ton Federal, two Fords and a K7-International, are kept busy either trucking from the bins to yard storage piles (99 percent of all production is placed in yard storage) or making local deliveries, principally to the block plant. Two Haiss rubber-mounted gasoline-powered Model 75 loaders are used to reclaim material from stock piles. These loaders each have a rated capacity of 120-eu. yd. per hr. Most of the sand and gravel not used by the block plant is sold to road departments and private truckers directly at the plant.

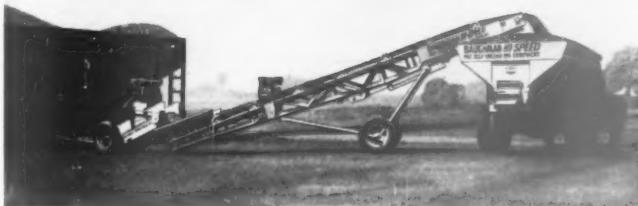
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NATIONAL CRUSHED STONE ASSOCIATION has published an illustrated booklet entitled, "How N.C.S.A. Serves Its Members," for the purpose of acquainting members more fully with the nature and character of Association services available, and to provide a concise and comprehensive presentation covering the advantages of association membership, J. R. Boyd, administrative director, has announced.

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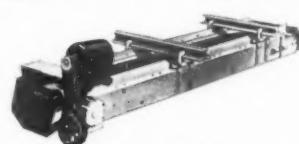
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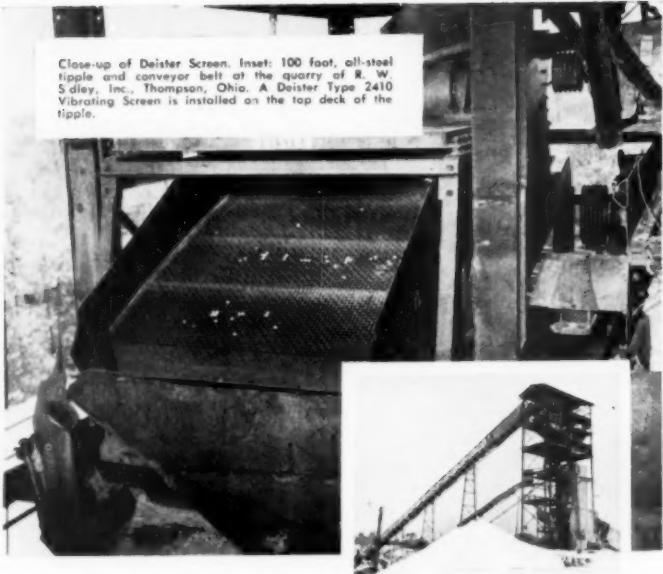


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Close-up of Deister Screen. Inset: 100 foot, oil-steel tipple and conveyor belt at the quarry of R. W. Sidley, Inc., Thompson, Ohio. A Deister Type 2410 Vibrating Screen is installed on the top deck of the tipple.

250,000 Tons in 1949...

A late addition to the equipment of the R. W. Sidley, Inc., silica quarry is a 4'x10' Deister Vibrating Screen — calculated to help Sidley reach its 1949 quota of a quarter million tons of silica sand.

R. W. Sidley, Inc., quarry one of the finest deposits of silica sand in the United States. About 25% of the pit's production is quartz pebbles, containing approximately 99% + pure silica. The quartz pebbles are sold to refractories and other companies for use in the manufacture of Ferro Silicon and ultimate application in the steel industry. In addition, the quartz pebbles have been found ideal for use in water filtration systems. The balance of the material quarried by Sidley is sold for road construction

and general aggregate use throughout the Cleveland area.

From the top of the Sidley tipple, material passes over a number of screens, but the 4'x10' double-deck Deister Screen is one of two screens at the very top. It handles half of the tonnage arriving via a 300 foot conveyor belt. Material is hauled from the pit by truck and dumped into a gyrating crusher. The conveyor belt takes it to the screens. The Deister Screen has operated continuously since it was installed one year ago. There have been no repairs . . . original screen cloth is still in use.

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DEISTER SCREENS

DEISTER MACHINE CO.

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Fineness of Cement

(Continued from page 103)

a series of 10 to 11 terms is sufficient. The error of the calculated area is positive. Since the numerical value of $\frac{100}{X_{\max}}$ lies, generally, between 0.7 and 0.9 the average value 0.8 is used for routine work. Simpson's rule is less suitable for evaluating Gates' area, since the relevant points of the particle size distribution curve (at equal abscissas, i.e., X values) should be derived from Rosin-Rammler's diagram or another graph. As much as 21 terms would be necessary to equal the accuracy of the other methods. Curiously enough, there is often a compensation of errors and five terms only give reasonable results. The errors are in both directions and amount sometimes to 100 sq. cm. per gram for the $S_{z,5}$ values.

Summary

It is shown that an adequate determination of portland cement fineness can be obtained only from a complete sedimentation analysis. For evaluating the surface values some principal assumptions are made and a formula for determination of comparable surface values is derived. Although these values are smaller than the actual surfaces they conform better with the hydraulic qualities of portland cement than the total surface values obtained by the gas permeability test. Considering that only approximate true values of the hydraulic active surface are sought for comparison, the difference between the found and the actual surface values seems tolerable. Fineness, after all, is only one of the factors which influences the hydraulic qualities of portland cement.

Acknowledgement is due to the Palestine Portland Cement Works, Nesher, Ltd., for permission to publish this paper, to Dr. A. Starkmann for reviewing the manuscript and to the American firms which supplied the cement samples and the data on turbidimetric analyses.

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Readers Discussion

(Continued from page 108)

It seems to us that Mr. Daniels' theory should be studied. From what we know about colloid chemistry, it seems possible that the introduction into wet concrete mix of small crystals of a calcite may provide nuclei on which the lime or calcium in solution can crystallize out. There are many instances in which solutions and gels will readily crystallize if small crystals or parts of crystals are placed in the solution or gel as nuclei. Whatever calcite or calcium carbonate went into solution, it would be as the bicarbonate, that is it would carry an extra radical of CO_3^- for each molecule. In giving this up to a solution of CaO or $\text{Ca}(\text{OH})_2$, by hydrolysis of the mixture, more carbonate or CaCO_3 would be formed which under the circumstances might crystallize out in the pores or capillaries of the limestone particles. It is also conceivable that decomposition of the humus in solution would also provide CO_2 for promoting the formation of CaCO_3 from the calcium hydroxide.

Whichever way to tackle these problems it seems to us that the answers lie more in the direction of colloidal geo-chemistry, than in ordinary chemical reactions, for we are dealing with agglomerations which can not be defined by the usual chemical formulas. We seem to have explored the ordinary chemical approach to several dead ends, but from the colloidal angle we have not yet scratched the surface of possibilities. Inorganic colloid chemists are rare. Most of the research in colloid chemistry in this country has been done in organic chemistry, biology, etc. However, the essential principles of colloid theory are not too difficult to grasp; and there is a virgin field here for the researcher in cement, aggregates and concrete.

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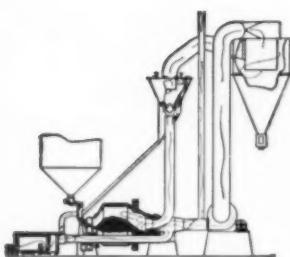
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Cement in Germany

(Continued from page 114)

be stopped nor curbed by law. Every plant manager had one foot in jail during these years, but without these "compensations deals," as they were called, the German industry would have never been able to recover.

Fortunately, cement was very high in demand and an excellent means for barter. Many plants obtained almost their entire supply of coal by furnishing cement to the coal supplier. Production capacities and cement sales rose steadily during 1946 and 1947. The need of cement for military construction purposes declined sharply and most of the cement manufactured was placed in the hands of civilian users. A regular construction boom set in and at no time could the industry satisfy anywhere near the demand for building materials. One of the main obstacles was the restriction on the use of electric power.

In June, 1948, when the German monetary system was drastically remodeled and the German Mark replaced the inflated Reichsmark, conditions changed over-night. The first shock was quite severe for everybody and dealt a heavy blow to the reconstruction program of Germany, but now, after one year of the German Mark, it can be stated, that although the operation was quite painful, it lead German industry and trade into sounder and safer channels. Even though prices went up considerably, industrial life was back to more normal basia. The wild building boom ceased and cement lost much of its glamour. Keen competition set in and, with it, demand for better cement. Very little had been and could have been done to retain or improve the quality of portland cement during and after the war. The conditions described above were hardly favorable to the production of cement of pre-war quality. One cannot expect to make the best cement, when only very low-grade coal is available for burning, and when the raw materials and the finished cement cannot be ground any finer than absolutely necessary and when there is insufficient electric power. Still, the cements always met the German cement specifications.

Quality Again Required

Today, the user of cement again looks for the best cement on the market, and conditions make it mandatory for the manufacturer to improve his product. Plant equipment and quality control must be brought up-to-date, or cement sales will drop. Cement research work, of which there was very little during the last ten years in Germany, will be given recognition again, and the interchange of ideas with foreign investigators, which fortunately is possible again, will tend to stimulate the work.

During the war, German cement specifications were drastically revised,

especially in methods for determination of strength properties. Testing for tensile strength was dropped completely and replaced by the determination of the bending strength of mortar bars, made from graded standard sand and of plastic consistency. Three types of cement, portland, iron-Portland and blast furnace slag-cement, in three qualities, as expressed by their respective compressive strengths, are listed in the specifications. The manufacture of a so-called economy cement, consisting of portland cement inter-ground with certain percentages of debris from wrecked city buildings, was practiced for awhile in order to make a material requiring lower consumption of fuel and to utilize at least a small part of the enormous piles of debris from the ruins of large cities. This cement, which was chiefly intended for concrete jobs of less importance, could never gain friends, neither with the manufacturer nor with the user, and its manufacture is now practically abandoned.

No drastic changes are contemplated in the near future with regard to a change in the basic properties of portland cement in Germany. Air-entraining cements are not being made in Germany, and there probably will be no place for them, since climatic conditions are not as severe as in the United States and de-icing of concrete pavements is practically unknown in Germany.

With the export business picking up again, German cement manufacturers must face the problem of meeting foreign specifications, which in some cases require different properties, especially with regard to fineness and soundness. The autoclave expansion test is not in favor in Germany; the boiling test is considered fully adequate.

At present, the German cement industry is engaged in the elimination of the last scars of war. It repairs, overhauls and, in some cases modernizes its own equipment. The chief aim is to make more and better cement, to gain a foothold in the export countries, and to broaden the domestic market against keen competition. With the coal and the power problem still unsolved, every effort is made to utilize every bit of waste-heat and to burn good clinker with least possible amount of heat.

Ceylon Cement Plant

WORK has been resumed on the government-owned cement plant at Kan-sesantural, Ceylon, begun approximately three years ago, *Mineral Trade Notes* reports. Construction had been delayed because of the slow arrival of machinery. Products from the plant are expected to be on the market by the end of the year, and it is hoped that the new operation will produce 20,000 to 30,000 long tons more than the prewar annual consumption of cement, which was about 70,000 tons.

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For Those Hard-To-Get-At Corners THE OSGOOD HOE

Powerful and easily maneuverable OSGOOD hoes dig deep and fast, dump clean. The all-steel reinforced boom provides

long reach and high dumping. The operator has clear vision and precision control of all movements for quick and accurate spotting of the dipper. The power dipper trip saves time and energy. The OSGOOD is versatile, too; is easily converted from Hoe to Shovel, Crane, Dragline, Clamshell or Piledriver. Write for descriptive literature and specifications.



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EXCAVATOR

MARION OHIO
DIESEL, GASOLINE OR ELECTRIC POWERED • ½ TO 2½ CU. YD. • CRAWLERS & MOBILCRANES



Pulverizers

Have you investigated our new
BRADLEY HERCULES MILL?
Unquestionably the last word in
Economy and Simplicity.
(Send for New Catalog No. 59)

BRADLEY PULVERIZER CO.

ALLENTOWN, PENNA.

Agstone Meeting

(Continued from page 116)

amount in a given area within a given period."

Mr. Crumpler also discussed considerations in the purchase of liming material under the contract plan for the 1950 program and in handling multiple bids. He mentioned the paragraph of the bid proposal which reads as follows:

"In the event that more than one bid is submitted for a given area of competition for any item from the same plant, only the most favorable offer will initially be considered irrespective of the quantity offered. All other bids for a given area of competition by the same bidder for delivery of the same product from the same plant will be rejected. All other bids for a given area of competition for delivery from the plant of the successful bidder will not be considered, unless such other bidder submits proof within 30 days after date of notice or rejection, which is satisfactory to the Production and Marketing Administration, that he is not substantially identified with the low bidder for the item involved. For the purposes of this solicitation all materials produced at one plant which meet the minimum specifications of standard ground limestone will be considered the same product, unless the nature of the different materials is such that the State P.M.A. committee determines that it is necessary to accept such offers to effectuate the purposes of the program. Offers for delivery of substandard material may be considered on the merits of each individual offer. The right is reserved to reject any or all offers for delivery of material not meeting standard specifications. Bids submitted for shipment from different points will be considered to cover the same plant where such bids are distinguished only by the fact that separate grinding units are involved in an otherwise integrated operation."

The interpretation given to the last sentence was clarified by saying that a producer cannot take opposite ends of his plant and call them different plants for the purpose of submitting bids. The plants need not be separated by the distance of 150 miles in order to be classed as different operations. In some cases, it can be even less than 5 miles. In order to further clarify this subject, it was assumed that a producer of agricultural liming materials had one or more dealers who quote in the same area as the producer of the material for the same business. In such cases this will be considered as only one source and the lowest quotation made from that source will be accepted to the exclusion of the others. A producer or supplier may make different quotations on standard and sub-standard material. This will not be considered multiple bidding.

A discussion followed on the weight to be given to magnesium content in

lining materials and on the need for lining freight cars.

Tony DiSanto presented the Status of the 1949 Program, and gave an idea of what might be expected from now until the end of the year as set up by the State Committee. A deadline is set up for the completion of the 1949 program by November 30. In other words, the goal set for delivery of contract materials is of that date, and was done in order to get an early start on the 1950 Program, which is considerably larger than 1949.

As of June 30, 1949, about 45 percent of estimated requirement had been delivered. This does not take into consideration the cash business.

Under the contract program for 1949, 475,000 tons are expected to be shipped, Mr. DiSanto said. In the purchase order counties, the tonnage will be about 200,000 tons. Cash business will bring the total for the state to well over 1,200,000 tons for 1949.

Mark Shuman, of the Pennsylvania Production & Marketing Administration, discussed the Policy of the State Committee on F.O.B. Plant Bulk, Plant Bag, Farm Bulk, Farm Bag and Spread Service. He indicated the 1950 policy will generally follow the pattern of the 1949 Program.

John Smith, Secretary of the State P.M.A. Committee, outlined briefly the Green Pastures Contest, in conclusion.

Dorena Dam

(Continued from page 118)

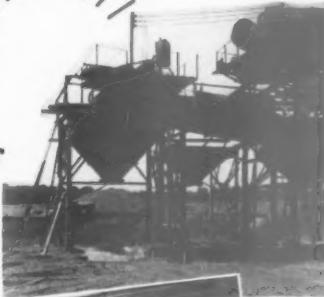
In a preliminary test of this classifier it showed 6 percent solids in the overflow and it had a sp. gr. of 1.040. The head on the wier was 1 1/4 in. and g.p.m. were 169. At the time this reading was taken there were some fines in the overflow so a settling box that is roughly 36- x 36-in. was added to the launder assembly at the ball mill discharge in such a manner that the 50 percent portion going to the other 48-in. sand machine via a 4-in. Wemco centrifugal sand pump has the fines collected in this settling box added to the pump's output. The screen analysis given for the sand from this machine was given after this settling chamber was added to the unit but it might be well to point out that none of the extra retained fine sand in the settling box is retained by the 36-in. machine—it goes to the 48-in. unit.

No attempt is made in this classifier to get a dry sand, and to help reduce the clay content of the sand produced a spray almost the length of the spiral that is above the water line is provided.

Returning now to the 12-in. screw conveyor that serves a multiple purpose: it will be observed that part of its discharge goes to the ball mill and the remaining portion goes direct to this same 36-in. sand machine through a launder that parallels the unit. The intake to the sand machine for this material is just above the opening



An Eagle Log Washer at the Thomas Gravel Co.



"We installed an Eagle Log Washer to remove clay balls and soft particles from our gravel and we do not hesitate to state that the washer is DOING JUST THAT." There's the satisfied statement of the Thomas Gravel Company after installing an Eagle at their Fort Worth plant. The Thomas pit is a river-bottom deposit of about 90 acres of excellent quality basic aggregate which did, however, need to be cleansed of undesirable material. Eagle sets a new high standard for trouble-free solution of just such knotty problems.

This 7x20 ft. paddle type log washer features the new paddle shoes with corrugated wearing surfaces which scrub and abrade stone against stone as the aggregate is conveyed up to the discharge. The constantly rising column of water from the tub bottom floats out all loosened trash, clay balls, etc. This two-way cleansing action is just one of the reasons why Thomas is able to conclude, "We are highly pleased with the operation of this Log Washer." Send for Catalog 47.



Sand and Gravel Equipment
"SWINTER" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS — REVOLVING SCREENS

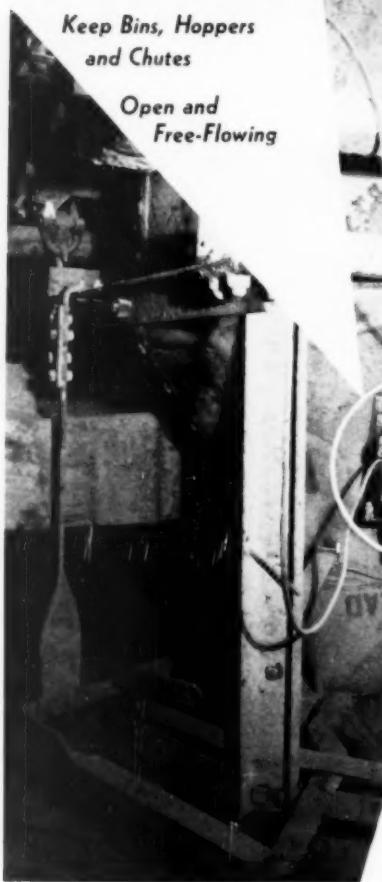
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where the ball mill discharge enters the sand machine. No accurate figure is available as to the tonnage going direct to the classifier and by-passing the ball mill, but indications are that it is two to three times the tonnage going to the ball mill.

The sand from the 36-in machine falls to an inclined 18-in. x 125-ft. belt conveyor that delivers to the truck loading hopper.

The other half portion of the ball mill's discharge and the fines from the settling box are pumped to the 48-in. sand machine. This machine also discharges its final sand product to the above mentioned 18-in. belt conveyor. On an early preliminary test, the overflow from this sand machine had 4 percent solids, a sp. gr. of 1.020 with the fines being minus 150 mesh. There was a 7-in. head on the wier and g.p.m. were 360.

The above analysis was taken after the sand box for fines was added to the assembly at ball mill discharge.

The 18-in. inclined belt previously mentioned receives both sands from the two sand machines where a blend is made.

Earlier in this discussion we mentioned that a 48-in. and a 36-in. Symons cone crusher were used along with the ball mill to manufacture the sand. Under the laminated wooden bins that hold the four sizes of coarse aggregate are four gates that can feed a 24-in., slow moving, inclined belt conveyor. Any size of rock desired can be fed to this belt. The belt feeds the 48-in. standard Symons cone crusher. As the material is wet from previous washing, the slow moving inclined belt tends to help drain excess water from the material. The crusher is normally set to deliver a 5-in. product and is driven by a 125-hp. motor. Indications are that the mantles and wearing parts will crush around 125,000 tons before replacements are needed. The crusher straddles conveyor Belt No. 6 that is inclined and delivers to a 4 x 12-ft. Symons screen with one deck in use only. The material on this belt, all or a part of it, can be spouted back to No. 3 belt that serves this short head final screen. It has 3/16-in. wire on it. The screen operates dry. Eight 1/2-in. log chains, each about the length of the screen, rest on this deck to assist in clearing the screen openings, for the material is not dry, nor can it be said to be damp. The oversize from this screen falls to Belt No. 7 that returns the material to the 36-in. short head Symons cone crusher. This unit is set to deliver a 3/16-in. product. It is one of the later additions to the plant set-up so no figures are available on wear of mantles, etc. The throughs from the Symons vibrating screen fall to the 12-in. multiple purpose screw conveyor previously discussed. This short head also straddles the belt serving the dry Symons screen.

The materials carried by this screw conveyor, as will be seen, are natural

sands plus cone crusher material.

An estimate by Aubrey Horn, engineer for the contractors, on the amount of sand produced by the various units is as follows:

	Percent
(1) Throughs from screen after short head	35
(2) From upper end of Symons screen on the final screening plant for coarse aggregates	5
(3) No. 1 Wemco sand classifier	60
Total	100

It is estimated that the addition of the short head cone crusher increased the sand plant capacity by 30 percent.

It is difficult to give a figure representing the total tonnage of sand produced per day but it ranges from 325 to 375 tons per 8 hr. day.

In the design of the earth fill for the dam, a 10-ft. wide section of gravel is interposed between the two faces of the dirt fill. This is placed in such a manner that any water seeping through the up-stream face will find an outlet on the down stream side via this porous area. So the aggregate plant operates the second shift to produce this material. The material is crushed if need be and run through the scalping scrubber, but otherwise no screening is done to the material. At that time the ball mill and cone crushing section is not operated. The plant does not operate a third shift. The plant has an over-all capacity of 1500 to 4000 t.p.d. There are 25 motors in the plant with connected load of 850 hp. Dorena dam is expected to be finished sometime in 1950 as winter operations are curtailed because of seasonal rains.

Water for the aggregate plant, batching plant, and for miscellaneous uses about the dam is supplied by three pumps two of which are rated at 650 g.p.m. each and one at 1000 g.p.m. for a total of 2250 g.p.m. Two of the units are Pomonas.

Air Entrainment's Effect on Durability

NATIONAL SAND AND GRAVEL ASSOCIATION has issued a report, Circular No. 34, on an investigation involving comparisons of three different sands in concrete, both normal and air entraining, when subjected to freezing and thawing. The tests have been carried on through 840 cycles of freezing in air at 0 deg. F. and thawing in water at 40 deg. F. at the rate of one cycle per day. The entrainment of air resulted in significant improvements.

Upholds Ban Against Stone Quarry

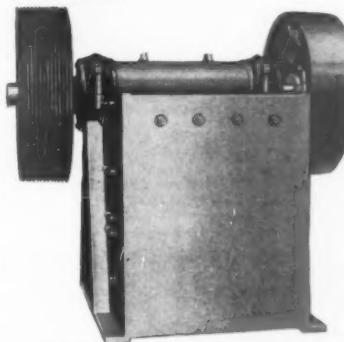
J. & L. SNOFFER, INC., quarry, near Dublin, Ohio, has been directed to cease operations by the Court of Appeals which has upheld a decision by Common Pleas Judge Joseph M. Clifford, halting operations of the quarry. He ruled the operations of the firm as a "nuisance" because of the blasting, noise and dust caused by the work there.

There is no GOOD substitute for Staged Rock Reduction...

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JOPLIN**

JAW CRUSHERS

Jaw crushers... the balancing unit in the material reduction circuit and one of the most important factors affecting the final cost of the finished product. Rogers crushers, in 18 sizes, are individually designed and correctly proportioned with long crusher jaws placed at the correct angle to secure superior crushing action, greater capacity, less slippage, less wear and less replacement costs. Bearing sizes are from two to three sizes larger than normally recommended... shaft diameters are likewise oversize, assuring freedom from breakdown and long, trouble-free service.



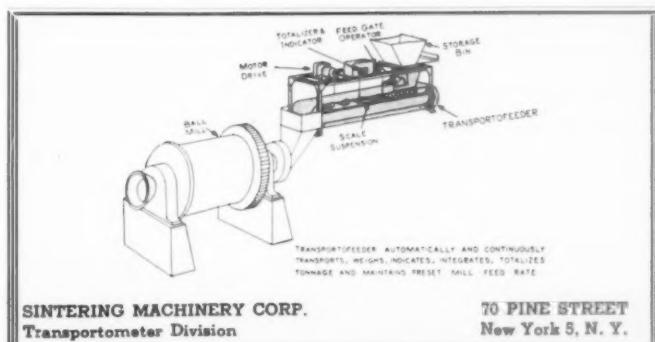
**PRIMARY CRUSHERS IN 6 SIZES
SECONDARY CRUSHERS IN 12 SIZES**

• Write for this folder on Rogers Jaw Crushers for more complete information. If you have a specific problem, consult our Engineering Department, no obligation.



ROGERS IRON WORKS CO.

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PYRASTEEL

PYRASTEEL's amazing record of service is demonstrated by the old type Kiln Ring, shown at left, which withstood high temperatures in a large cement plant in Dallas, Texas, for over 14 years.

This solid ring casting, recently scrapped, weighed 4200 lbs. Today's segmented type Kiln End of the same size would save at least one ton in weight, and about \$1000 in cost.



Over 76% of the annual cement output is produced in plants that now are using either or both of our alloys, PYRASTEEL and EVANSTEEL.

Durable PYRASTEEL Kiln Ends enable modern cement plants to avoid costly burnouts and shutdowns.

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Manufacturers' News

A JOINT COOPERATIVE committee of the Construction Industries Association and The Associated General Contractors of America has been established for the purpose of providing a medium through which manufacturers and general contractors can cooperate to increase efficiency in the construction industry. Representing the C.I.A. are W. B. Greene (co-chairman), president, Barber-Greene Co., Aurora, Ill.; Everett F. Armington, vice-president in charge of sales, Euclid Road Machinery Co., Cleveland, Ohio; J. T. Callaway, assistant to the vice-president, The Goodyear Tire and Rubber Co., Inc., Chicago, Ill.; Carlton R. Dodge, vice-president, Northwest Engineering Co., Chicago, Ill.; Kenneth Lindsay, vice-president, Iowa Manufacturing Co., Cedar Rapids, Iowa; H. R. Meeker, president, The J. D. Adams Co., Indianapolis, Ind.; H. T. Reishus, general manager, Industrial Power Division, International Harvester Co., Chicago, Ill.; and Julian R. Steelman, vice-president, Koehring Co., Milwaukee, Wis. Harold F. Hess is executive secretary of the C.I.A.

Lima Shovel & Crane Div., Lima-Hamilton Corp., Lima, Ohio, has appointed the following sales representatives: The Flack Equipment Co., Toledo, Ohio, will cover the Toledo area; John C. Louis Co., Inc., Baltimore, Md., the District of Columbia, States of Maryland and Delaware with the exception of New Castle County, and the counties of Arlington, Fairfax and Loudoun in the State of Virginia. The Buran Equipment Co., Oakland, Calif., will cover Northern California; Metalweld, Inc., Philadelphia, Penn., will serve the Philadelphia sales area; Scott Machinery Co., Concord, N. H., the State of New Hampshire; and Stockberger-Seastrom, Inc., Melrose Park, Ill., the Chicago Area.

The Dorr Co., New York, N. Y., is planning to move its main office to the Northam Warren Bldg., Stamford, Conn., in December of this year. An office will be continued at 570 Lexington Ave., New York, N. Y., for convenience of executives of the company, foreign and other visitors, and to accommodate a branch sales office.

The Osgood Co. and the General Excavator Co., Marion, Ohio, have announced the appointment of Earl R. Herb as district sales manager in the States of North and South Dakota, Minnesota, Wisconsin, Michigan, northern Indiana and northern Illinois. He will make his headquarters in Milwaukee, Wis.

The Euclid Road Machinery Co., Cleveland, Ohio, has appointed Euclid-Kentucky, Inc., Louisville, Ky., as distributor for the state of Kentucky, replacing Brandeis Machinery & Supply Co., Inc. Reid-Holcomb Co., Indianapolis, Ind., has been assigned southern Indiana territory formerly served by

Brandeis, and Euclid Sales & Service, Inc., St. Louis, Mo., will take over southern Illinois counties formerly covered by Brandeis. Clark-Wilcox Co., Boston, Mass., has been assigned the state of Maine and parts of New Hampshire formerly assigned to Eastern Tractor & Equipment Co., plus the state of Vermont. This is in addition to their present coverage of Rhode Island, counties east of and including Worcester in Massachusetts and several counties in New Hampshire.

Cardox Corp., Chicago, Ill., has appointed the Layne-Northwest Co., Milwaukee, Wis., as distributor of Cardox-Hardsoc surface drilling equipment in the southern half of Wisconsin.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., announces that A. Lawrence Stewart and Arthur L. Foltz, Jr., have been appointed sales representatives in the Cleveland and Detroit district offices, respectively.

National Roll & Foundry Co., Avondale, Penn., has established a separate division to handle Ni-Hard castings which are sold under the trade name "Monicro." A. M. Houser has been appointed sales manager of the division.

Mechanical Industries, Inc., Pittsburgh, Penn., is the name of a new engineering company established by Morton I. Dorfan, an expert on industrial dust and fume engineering, who has been associated with this field for 35 years. Activities of the company will be limited to industrial ventilation, smoke, dust and fume control. Mr. Dorfan is president and general manager.

Sheffield Steel Corp., Kansas City, Mo., has announced the appointment of D. E. Norquist as manager of grinding media sales. He has been with the company for 15 years. As Eastern representative for grinding media and specialty products he has acquired a background of experience with microscopic analysis, test data and metallurgy in the research department, and sales experience in metallurgical sales as acting district manager of the Denver sales office.

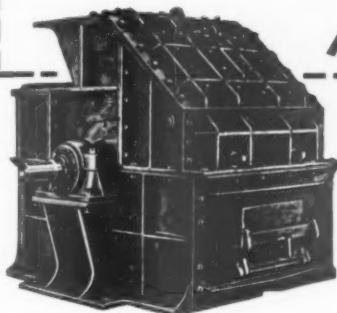
Fairbanks, Morse & Co., Chicago, Ill., has appointed Frank M. Mason, Jr., as director of engineering, with headquarters in Chicago. Mr. Mason, who has for several years been manager of the research division in charge of all research, developments and patents, joined the company in 1922 following his graduation from Northwestern University, Massachusetts Institute of Technology and Washington University. He was first employed in the engineering department at the Indianapolis plant. In 1923 he was transferred to St. Louis to organize a pat-



D. E. Norquist

HIGH EFFICIENCY REDUCTION for Your CRUSHING NEEDS

with
AMERICANS



Three different hammer types are furnished to meet the exact production you require. A. "Brute," for heavy.

A. BRUTE
for heavy

B. "Broad-head," for medium.

B. BROAD-
HEAD
for medium

C. "Splitter," for fine.

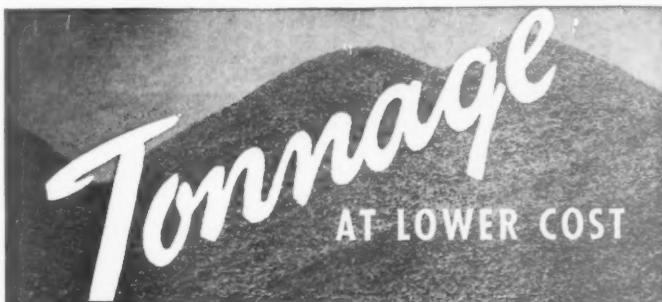
C. SPLITTER
for fine

From agstone to roadstone sizing, Americans offer the flexibility and rigid control of sizing — to make each specific reduction job more efficient — and more profitable! For better agstone sizing, American ACS Hammermills are designed with a special center feed — to lengthen the travel of stone and give a higher ratio of fines. With the conventional front feed, minimum fines are assured. Easy external adjustments give the individual size control and flexibility to meet your changing market needs.

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- Cleveland Wire Screens produce more stone per section because they are made of better grade spring steel and expert craftsmen do the job. Extra tonnage and increased dollar profits will be yours when you install Cleveland Wire SCREENS on your vibrating equipment.

There's a Cleveland Wire Screen for Every Purpose

NO PULL-OUT • NO SAG • LONGER SERVICE
EASY TO CHANGE • EXTRA STRENGTH
DRUM-TIGHT TENSION

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Trunnion wheels, operating in limestone dust under 40 tons pressure, are hard-faced with Amsco TOOLFACE for long wear. TOOLFACE provides abrasion resistance up to 1100°F where toughness is required; in this range TOOLFACE is both harder and tougher than the popular cobalt base alloys No. 1 and 6. Typical TOOLFACE applications are steel mill tong bits, lumbering chipper knives and metalworking cutting tools. TOOLFACE rods and electrodes are high speed steel with 575-675 BHN deposit hardness . . . weld readily to mild steel. Welded parts may be forged, softened for machining and re-hardened.

Brake Shoe

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STEEL DIVISION**

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Offices in Principal Cities

ent department. Two years later he joined the research division in Chicago and subsequently became assistant manager and then manager.

Raybestos-Manhattan, Inc., Passaic, N. J., announces that a 320-ton precision hydraulic press for vulcanizing conveyor belts has been put into operation at the Passaic, N. J., factory of the Manhattan Rubber Division. The press was built by The Baldwin Locomotive Works from company specifications.

General Refractories Co., Philadelphia, Penn., has announced the appointment of Harry T. Graham as assistant general sales manager. Mr. Graham joined the Chicago sales office in 1937 and was transferred to the Philadelphia office in 1946. He has been assistant district sales manager of the Pittsburgh office since 1947.

Westinghouse Electric Corp., Pittsburgh, Penn., has appointed W. J. Howell as assistant to Tomlinson Fort, manager of apparatus sales. He has been assistant to the district manager, Pacific Coast district, San Francisco, Calif., since March, 1941.

General Electric Co., Schenectady, N. Y., announces that Martin R. King has been appointed manager of the apparatus department news bureau, succeeding C. P. Fischer, Jr., who has been named manager of a new promotional division to be announced later.

Chase Bag Co., Chicago, Ill., announces that its Reidsville, N. C., branch employees have been presented with pins by the National Safety Council for having accomplished 500,000 continuous working hours without an accident. The company's annual Safety Banner was also awarded to the Reidsville branch.

Gould Storage Battery Corp., Trenton, N. J., announces that it will hold a five-day school on the care, maintenance and charging of storage batteries, at the Trenton plant, November 14 to 18. Companies utilizing industrial trucks and mine haulage equipment are invited to send battery maintenance supervisors, materials handling engineers, mine foremen and others who are engaged in the care, maintenance and operation of storage batteries.

DeLaval Steam Turbine Co., Trenton, N. J., has appointed C. C. Bray as regional supervisor of the Midwestern district office recently opened by the Imo-DeLaval Products Division at 1500 S. Western Ave., Chicago, Ill. F. H. Bagley has been transferred from the Chicago district office to the new Midwestern office, where he will continue to handle the sales and service of DeLaval-Imo pumps.

United States Rubber Co., New York, N. Y., has appointed Howard H. Weber as general sales manager of the wire and cable department. Clarence H. LeVee has been named eastern division sales manager for Boston, New York, Buffalo, Syracuse, Philadelphia, Baltimore, Atlanta and Pittsburgh branches, with headquarters in

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for
STONE - CINDERS - COAL**



10 to 20
ton per hour
capacity

\$395.00

25 to 50
ton per hour
capacity

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BONDED VIBRATING SCREENS



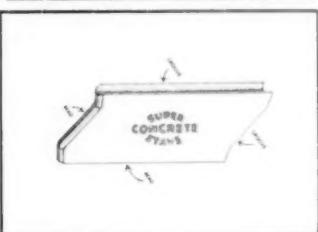
Make your product more salable at higher prices. Built in 1 to 5 decks, with screening areas 2 to 5 feet wide and 3 to 14 feet long. Priced from

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Manufacturers of Scales, Conveyors, Idlers,
Vibrating Screens, Crushers and Feeders.



THE STAVES WEDGE

Because of the patented design of the Neff & Fry Stave, each one interlocks with six others, forming a firm and symmetrical structure. Galvanized steel rings are drawn around the zig-zag joints and in between—as many as needed to resist lateral pressure.

Neff & Fry Bins are used for handling and storing aggregates, ashes, cement, chemicals, cinders, clay, coal, coke, fertilizer, grain, gravel, lime, limestone, minerals, ore, sand, sawdust, scrap, seeds, slag, water, wood pulp, and many other materials.

We'll be glad to give you the benefit of our 28 years' experience in engineering and erecting storage bins. Write, wire, or phone.

**THE NEFF & FRY CO.
CAMDEN, OHIO**

**NEFF & FRY STORAGE BINS
FOR ALL BULK FLOWABLE MATERIALS**

New York City. J. A. Leuver has been appointed western division sales manager for the Cleveland, Detroit, Chicago, Cincinnati, Indianapolis, Milwaukee, Minneapolis and Omaha branches, with headquarters in Chicago. Don B. Karlskind has been named southern western division sales manager in charge of branch sales in Birmingham, New Orleans, Houston, Dallas, Kansas City, Tulsa, St. Louis and Denver. He will make his headquarters in Dallas, Tex. L. M. Guibara will supervise sales in Los Angeles, San Francisco, Portland, Seattle and Salt Lake City as Pacific Coast division sales manager, with headquarters in Los Angeles.

The Jaeger Machine Co., Columbus, Ohio, has announced the appointment of J. H. Yearling as general sales manager. He has been associated with the company for 22 years and served as credit manager and assistant treasurer before entering the sales department where he has been manager of advertising and market research



J. H. Yearling

since 1941. As sales manager, much of his time will be spent in the field coordinating the work of the sales organization with distributors in 130 cities of the United States and Canada.

Baker Industrial Truck Div. of The Baker-Raulang Co., Cleveland, Ohio, announces the appointment of Edgar E. George as district sales representative, serving as material handling engineer for Baker truck applications and handling sales of the equipment. He will make his headquarters in High Point, N. C. Mr. George was formerly associated with Dura-Products Mfg. Co., Canton, Ohio, as secretary, treasurer and sales manager, and with the Mirro-Products Co., High Point, N. C., as president.

R. G. LeTourneau, Inc., Peoria, Ill., announces that Carl D. Smith has joined the technical staff as special representative of the sales division, with headquarters at Peoria. Mr. Smith, who is known throughout the industry as an authority on tire performance, was associated with Firestone Tire & Rubber Co., Akron, Ohio, for 26 years before joining LeTourneau.

Marion Power Shovel Co., Marion, Ohio, has appointed the Depco Detroit Corp., Detroit, Mich., as distributor for all of the Lower Peninsula of Michigan with the exception of several counties in the southwestern corner of the state.

Blaw-Knox Co., Chemical Plants Division, Pittsburgh, Penn., has been selected by the Atomic Energy Commission, Idaho Falls, Idaho, for negotiations for a contract covering architect-engineer services for the engineering

DIG-HAUL-DUMP



Sauerman Slackline Cableway moves gravel directly from wet pit to processing plant.

for a
**Few
Pennies
a yard!**



Sauerman Scraper moves 54 tons an hour of sandstone from high bank to processing plant.

increase your output—cut your cost —

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design of a materials testing reactor and the preparation of detailed specifications and cost estimates. Primary purpose of the reactor will be to test various reactor construction materials under intense neutron bombardment.

Westinghouse Electric Corp., Pittsburgh, Penn., has announced the appointment of Hendley Blackmon, formerly managing editor of Electrical World, as assistant manager of engineering association activities. He will make his headquarters at the East Pittsburgh works, assisting Frank Thornton, Jr., manager of engineering association activities, and working with company engineers in the preparation of papers to be presented before engineering associations.

Noble Co., Oakland, Calif., manufacturer of batching and concrete handling equipment, announces the appointment of William H. Schutte as vice-president of the steel forms di-



William H. Schutte

H. L. Vines

vision. He was formerly vice-president of the Western Pipe & Steel Co. and also served 10 years with Blaw-Knox Co. H. L. Vines has been promoted from general sales manager to vice-president of the batching equipment division. He joined the company four years ago, after having served as district representative for Caterpillar Tractor Co., and western sales manager for R. G. LeTourneau, Inc.

American Wheelabrator & Equipment Corp., Mishawaka, Ind., announces that T. Max Stanger has joined the sales staff and will make his headquarters in Salt Lake City, Utah.

The Hays Corp., Michigan City, Ind., announces that Frederic I. Lackens, advertising manager for 12 years, has retired and will reside permanently in Fort Lauderdale, Fla. He will be succeeded by Phil Sprague, Jr., who for the past year has been acting as research assistant to Neil H. Borden, professor of advertising.

Flexible Tubing Corp., Branford, Conn., has appointed A. H. Loux as manager of distributor sales, according to an announcement by Frederick K. Daggett, president. For the past year Mr. Loux has been direct factory representative for northern New York and adjacent territory.

Noble-O'Roark Construction Co., Marked Tree, Ark., has been appointed dealer for Perma-Stone in the counties of Poinsett, Cross, Lee, Monroe, St. Francis and Phillips, Arkansas.

Borg-Warner Corp., Chicago, Ill., announces that Walter M. Reynolds has been elected secretary of Morse



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Chain Co., a division of the corporation, in addition to his duties as controller of the division. R. P. Johnson, first vice-president, has been named treasurer. They succeed the late Stanley B. Waring who was secretary and treasurer. Announcement has also been made of the sale of the Superior Sheet Steel Division plant, near Canton, Ohio, to The Louis Berkman Co., Steubenville, Ohio.

Sika Chemical Corp., Passaic, N. J., has appointed L. B. Keen, sales engineer, Providence, R. I., as representative in the states of Connecticut and Rhode Island.

Acrow, Inc., New York, N. Y., has appointed Funkhouser Machinery Co., Kansas City, Mo., as distributor in western Missouri and the entire state of Kansas. Townsco Equipment Co., Oklahoma City, Okla., will handle the state of Oklahoma, and G. F. Smith Co., Inc., St. Louis, Mo., will represent the company in eastern Missouri and southern Illinois. Lauren Burt, Inc., Denver, Colo., has been named distributor in the states of Colorado and Wyoming.

Air Reduction Sales Co., New York, N. Y., has appointed Frank J. Aschenbrenner and Earl C. Clark as assistant directors of research and engineering. Mr. Aschenbrenner will be in charge of the Murray Hill, N. J., laboratory, and Mr. Clark has been placed in charge of the development and engineering groups. J. K. Hamilton, manager of the apparatus research division, and Dr. G. B. Carpenter, manager of chemical research division, will report to Mr. Aschenbrenner. Announcement has also been made that the technical relations department has been transferred to the secretary's department, and that John J. Crowe, assistant vice-president and manager of the department, will report to J. D. Gunther, secretary. F. P. McKechnie, chief engineer; W. Wilkinson, manager of liquefaction division, and C. J. McFarlin, manager of process engineering division, will report to Mr. Clark. Dr. L. I. Gilbertson has been appointed administrative manager, and L. M. von Wanckel has been named executive accountant. Frederick C. Saacke has been made safety engineer in addition to assisting Mr. Crowe in technical relations. On the staff of the Murray Hill, N. J., laboratory will be J. K. Hamilton who becomes manager of the apparatus research division, with H. O. Klinke as assistant manager. J. T. McKnight has been appointed superintendent of production and services section, and T. J. Cholis has been made supervisor of patent section.

Harnischfeger Corp., Milwaukee, Wis., announces that A. J. Rinnander will supervise field activities, Zip-Lift hoist distributors and sales under the direction of E. W. Potratz, manager of the hoist and Trav-Lift crane division, Milwaukee, Wis. Mr. Rinnander was formerly with the Chicago Pneumatic Tool Co., New York, N. Y.

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For shipment to one customer

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Available Sizes for reasonable prompt shipment

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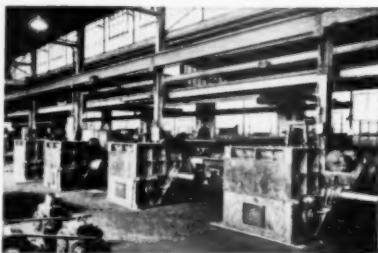
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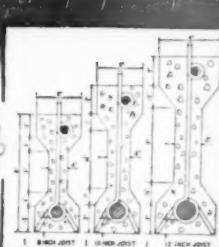
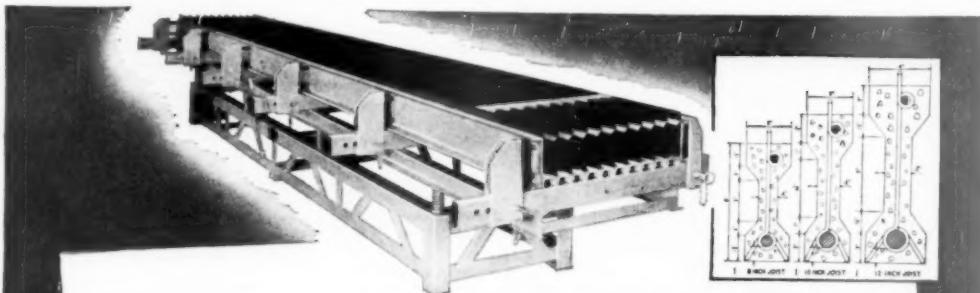


Cement Supply in Turkey

AS THE SHORTAGE OF CEMENT continued into 1948, the Turkish government planned further measures to insure a better supply. *Mineral Trade Notes* reports. Production in 1947 was about 350,000 metric tons, which was far short of requirements, even with imports. In May, 1947, cement was included among commodities that might be imported into Turkey against free exchange; in August a communiqué was issued that regulated further the sale and distribution of cement through a complex distribution system; and in June a new plant was opened at Derince. In January, 1948, an order for purchase of 60,000 more metric tons of portland cement was authorized in order to increase the supply.

Bentonite Waterproofing

TRANSLATIONS of a paper on bentonite and its application in waterproofing by E. Lemaire has been placed in open file by the Geological Survey. The paper treats very briefly some uses of bentonite as an agent for waterproofing masonry and earthworks, for blocking leakage zones in wells under construction, and as a stabilizing agent for certain mortars and cements. Some copies of the translation are available and may be obtained from the Director, U. S. Geological Survey, Washington 25, D. C.



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**Only small
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The addition of the Kirk & Blum Vibrating Table to your present equipment requires a very small initial cost, enables you to make an entirely new line of 8", 10" and 12" joists in 20 and 24 ft. lengths.

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Cash in on the ever-growing demand for steel-reinforced concrete joists. Your experience and contacts in the building trade should make it easy to build up a profitable business in this new line. Concrete joists are simple to make, have unusual strength, are termite proof. The KIRK & BLUM Type "S" Heavy Duty Vibrating Table is capable of multi-production of concrete joists, allowing a fine profit-margin. Easily produced by unskilled operators. For complete details and prices, write to The Kirk & Blum Mfg. Co., 2910 Spring Grove Ave., Cincinnati 25, Ohio.

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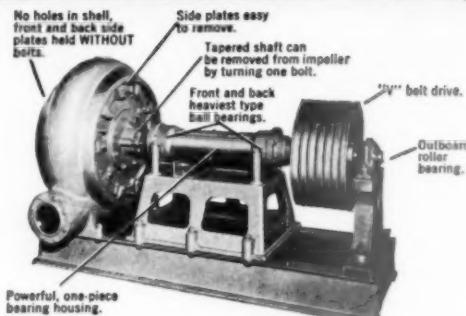
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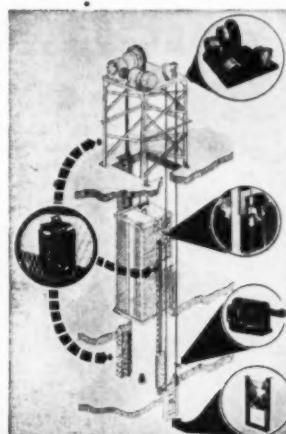
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CONCRETE PRODUCTS

CONCRETE UNITS . READY-MIXED CONCRETE



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You are—you, the customer. You're the one who brought about the formation of the Truck Mixer Manufacturers Bureau.

You didn't like the multiplicity of sizes and capacities of truck mixers. You didn't like the constant changes in capacity that meant that your machines became obsolete in a hurry. You didn't like not being able to bid accurately and figure your truck mixer costs accurately. Your collective, justified complaint demanded that something be done.

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Affiliated with The National Ready Mixed Concrete Association

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THE JAEGER MACHINE COMPANY
Columbus, Ohio

WORRINGTON PUMP & MACHINERY CORP.
RANSOME DIVISION, Dunellen, N. J.

THE T. L. SMITH COMPANY
Milwaukee, Wis.

INDUSTRY NEWS

Split Block With Face Resembling Stone

EUGENE LEIPOLD has placed in operation a machine for splitting slabs of concrete masonry to produce a veneer building material that resembles natural stone. Mr. Leipold, who has been in the concrete masonry business for approximately 20 years, has organized the Split Rock Products firm at Milwaukee, Wis., to handle production and sales of the material. Present output is enough to veneer one average-sized house per day.

Slabs of concrete masonry, approximately 3 in. thick and 12 x 16 in. to 16 x 16 in. long are fed into the machine which first cuts a shallow groove with a carbide saw, then cracks off a piece with an air cylinder powered knife. The separated pieces are uniform in size but no two have the same exterior face—thus resembling stone. A variety of color is achieved by using various types of aggregate.

Short Course for Industry Technicians

NATIONAL READY MIXED CONCRETE ASSOCIATION has announced tentative plans for a fourth annual Short Course of Instruction for Industry Technicians to be held November 14-19 at the University of Maryland. The short course is presented by N.R.M.C.A. and the National Sand and Gravel Association, in cooperation with the university, for technicians in the sand and gravel and ready-mixed concrete industries to familiarize them with basic and fundamental knowl-

edge of aggregates and concrete, with emphasis being placed on specifications, methods of test and problems of designing and controlling concrete mixtures.

Idaho and Utah Block Producers Organize

THE INTERNATIONAL BLOCK MANUFACTURERS' ASSOCIATION has been formed by a group of producers in Idaho and Utah. At the start plans were laid for more intensive sales and merchandising efforts on the part of the several members of the group, and special efforts will be made to solve problems in connection with F.H.A. and fire insurance rating authorities.

Establish Ready-Mix Plant in Havana

INDUSTRIAS HORMIGON CUBANO, S.A., (Cuban Concrete Industries, Inc.), a recently organized transit-mix concrete firm in Havana, Cuba, has started operations with a fleet of ten Worthington-Ransome Blue Brute 4½-cu. yd. truck mixers, which were shipped to the firm by seatrain.

Concrete Masonry

AN ARTICLE, "CONCRETE MASONRY" appears in Technical Bulletin No. 9, published by the Housing & Home Finance Agency, Detroit, Mich., providing information on concrete masonry construction and covering materials, standards, manufacturing processes, and curing procedures for the construction of concrete walls.

Marks 35th Year

WAUKESHA CEMENT TILE Co., Waukesha, Wis., recently observed its 35th year in business and a new office building was opened. The firm supplies the states of Wisconsin, Illinois and Michigan with culvert, sewer pipe and drainage tiles. John Waite is president and founder.

BERNARD CORDS, owner of a gravel business in Waterford, Minn., has purchased the Northfield Concrete Products Co. at Northfield, from Palmer Haugland. The Northfield firm manufactures and installs concrete septic tanks in rural areas. Mr. Haugland currently operates a concrete block plant in Minneapolis.

FRED OVERY and sons have started the manufacture of concrete block at Elyria, Ohio.

MICHEL CONCRETE PRODUCTS Co. has placed a ready-mixed concrete plant in operation at Mitchell, S. D. The company also operates a concrete block plant. Capacity of the new operation is 60-70 cu. yd. per day.

GRAHAM AND SCHENCK LUMBER Co., West Union, Iowa, has started production of ready-mixed concrete, Frank Kraft, manager, has announced.

GEIGER READY-MIX Co. has been established at Leavenworth, Kan., by E. W. Geiger.

DIAMOND GRAVEL Co., Las Cruces, N. M., has added a 4-x-6-x 12-in. unit to its line of cinder block, F. A. Bunch, owner and operator, has announced.

ALABAMA CEMENT TILE Co., Birmingham, Ala., in approximately three years has expanded so that it now is producing slag and cinder block, in addition to heavy concrete units, and sells aluminum and Steelcraft windows and door frames, pre-cast F & A floor joists, concrete filler tile and Perma Stone siding.

LAY-RITE PRODUCTS Co., Billings, Mont., has been purchased by Elmer S. Cormier and Donald F. White.

NORMAN WITHEY & Co., INC., Madison, Wis., has been incorporated with 250 shares, par value \$100, and a minimum capital of \$13,400 to manufacture concrete products. Norman H. and M. O. Withey are the principals.

READY-MIXED CONCRETE, INC., Mansfield, Ohio, which recently moved to a new location, where it is housed in a \$150,000 plant, has tripled its former capacity, Herbert Rush, president, has announced, and has increased its fleet of mixer trucks from two to seven.

ATLAS LIME Co., El Paso, Texas, is manufacturing volcanic-cinder-concrete block in 38 types and sizes according to John P. Sheehan, president of the firm, and plans have been made to add block for forming a solid concrete roof slab to the line.

BARGER AND COSTELLO has established a plant at Roberts, Ill., for the production of concrete tile.



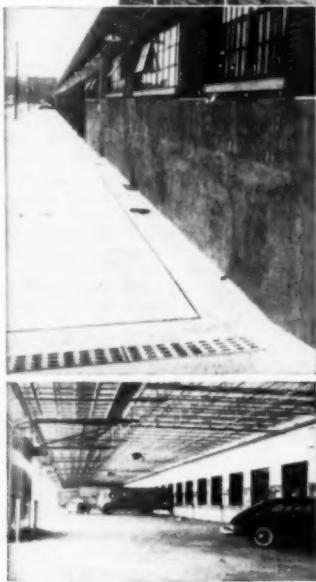
Formigli Corp., Berlin, N. Y., is making use of this Ryan Navion airplane for inspection trips and trouble-shooting. Company plants produce concrete roof-decking and joists, and such specialties as stadium slabs, pilings, cast stone trim and architectural slabs, which are sold all along the Atlantic coast. Since their proper installation requires frequent inspection, a heavy travel schedule is in order, which is simplified and speeded up through the use of the plane, according to O. L. Formigli, firm president. Left to right: Paul Formigli, Jr.; Arthur Hirst, outside superintendent; Paul W. Gleason, sales manager; Joseph Stalano (in cabin); manager of the Formigli Berlin plant Otto Formigli, and Paul Formigli Sr., all of whom fly for the corporation.



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A & P's NEW CONCRETE WAREHOUSE EXEMPLIFIES EFFICIENCY OF WORLD'S GREATEST FOOD-SERVICE ORGANIZATION



IN spanning the gap between thousands of fields and millions of tables, The GREAT ATLANTIC & PACIFIC TEA COMPANY employs the quality approach to quantity merchandising. Witness this new Produce-and-Meat Warehouse, covering an entire city block in Newark, N. J., linking food supply sources with great super-markets. Each kind of produce has its own storage conditions. Inside loading is provided—rail on one side—trucks on the other, with 21 motor-operated doors.

Top-grade construction—one of a number of projects built for A & P by WM. L. BLANCHARD CO., Newark. The 6,000 cu. yds. of concrete were designed for 5,000 lbs. compressive strength—readily achieved with Lone Star Cement and concreting know-how. Such structures exemplify efficiency that makes A & P Number One on the Eat Parade!

FALL CONCRETING REMINDER:

Use "Incor" 24-Hour Cement—protect against sudden temperature drops. Without protection at 50°, a common fall condition, "Incor" concrete attains stripping strengths, is safe from freezing, 2 or 3 days sooner. For timely illustrated booklet, "Cold Weather Concreting," write us at 342 Madison Avenue, New York 17.

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CONCRETE for DORENA DAM

Plant produces up to 1000 cu. yd. of air-entrained concrete per day. Batching cycle is completely automatic

SOME CONCRETE TECHNOLOGISTS are stressing the idea that use of reactive materials from an aggregate itself may be a corrective for so-called "reactive aggregates" when used with high alkali cements. As one proponent of the theory put it "... If you grind the reactive portion of the aggregate to minus 100 mesh or finer, put this fine material in the mixer at say, 10 lb. per cu. yd. of concrete or more, the harmful reaction between the aggregate and the alkali portion of the cement takes place very quickly before the concrete has set; therefore none of the harmful expansion properties takes place ... at least if they do take place they do no harm ..."

From a preliminary canvass of several state engineers we find that the above idea is working out satisfactorily in some cases—not all, and the subject is being given considerable study and investigation. The Bureau of Reclamation and the Army Engineers are well out in front on this subject.

The Dorena dam now under construction by the Engineers Corps near Cottage Grove, Ore., is not a large structure compared to some dams. It involves the placing of about 162,000 cu. yd. of concrete and 4,000,000 cu. yd. of compacted dirt fill. However, the project is of considerable in-

By WALTER B. LENHART

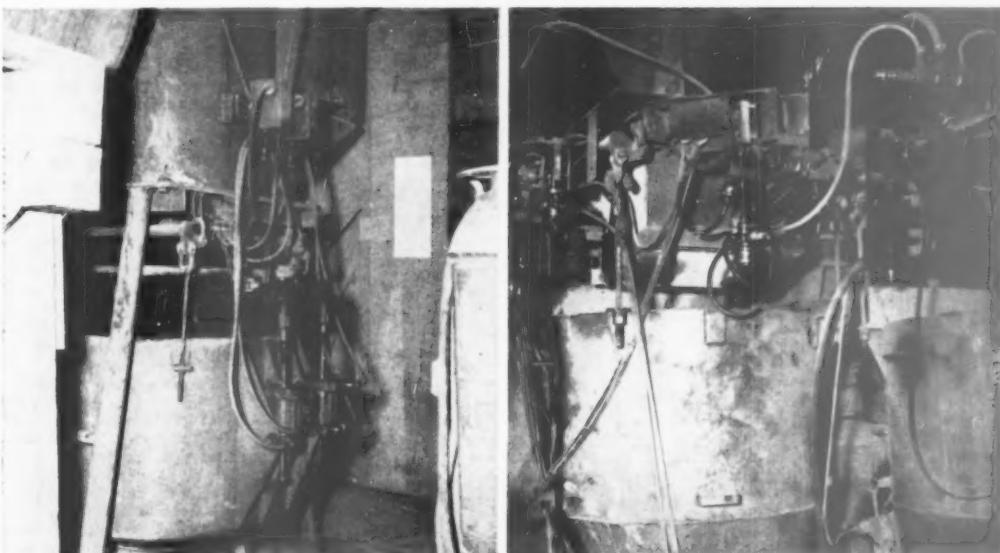
terest to our industry because of the nature, and use of the fine and coarse aggregates used.

In this issue of ROCK PRODUCTS we published a detailed article on the aggregate production facilities that emphasizes the production of sand by grinding coarser aggregates by a combination of Symons cone crushers and a Hardinge ball mill. The aggregates that are produced at the dam site are a very complex material containing agates, cherts, chalcedony and similar hydrated silica materials that have been grouped in the reactive aggregate category. The deposit is deficient in sand and what sand there is in the deposit is lacking in the finer sizes, so after extensive tests by the Clinton, Miss., laboratories of the Engineers Corps, and in view of the more recent knowledge of concrete, the material was accepted by specifying that the cement used be the Type "IV," or low heat cement, and low alkali (0.65 percent).

Whether intentional or not, by grinding available coarse and complex aggregate to sand, the Dorena operation may be adding a safety factor to the resulting concrete, for in

essence, some finely ground reactive aggregate is being added to the concrete that could tend to act as a corrective for the subgrade particles in the mass. The work at Dorena will be followed with considerable interest for it may point to a simple way for a sand and gravel producer, whose aggregates may contain some of the reactive material, to supply the trade an acceptable material, for all he would have to do would be to put in a fine grinding unit and use this sand with his other aggregates. Or he might put in a sink-float unit, separate the reactive portion from the non-reactive, then grind the reactive portion to minus 100-mesh and use it as the admixture.

The batching plant at Dorena features two Koehring heavy duty, 2-cu. yd. mixers with fully automatic Johnson batching equipment above. The plant is turning out 800 to 1000 cu. yd. of concrete per day. In the batching assembly there are five-cone-shaped weighing hoppers, one each for the 6 in., 3 in., 1½ in. pea and sand aggregates. The cement is weighed separately. The batching cycle is entirely automatic and operates through electrical and air-operated gates. One change that has been made here is that each weighing compartment has been made into a separate unit. Under



Left: Admixtures are automatically weighed and dropped into water below. Air valves and operating cylinders for this operation are shown.
Right: One of the cone-shaped weighing pockets for aggregate



Operator controls gates in reclaiming tunnel at batching plant

earlier operating methods, if any part of the automatic cycle failed the entire operation stopped automatically. Then it was a matter of hunting out which section was at fault and this often took considerable time. By "unitizing" the operation, only the section involved stops automatically and the trouble is quickly located. Water is also weighed and is automatically controlled.

Various air-entraining admixtures were tried out and it was decided to use Protek Vinsol, made by the Autolene Lubricants Co., Denver, Colo. From 4 to 6 ounces per cu. yd. are used in the concrete as will be seen later in these data. This air-entraining admixture has been found to be very consistent and reliable. W. A. Schwarz, Resident Engineer for the Engineer Corps, said that when used with the mass concrete where the 6-in. to 3-in. cobbles were used and only 3 sacks of cement per cu. yd. were used, the mixture looked pretty rough at first, but when the vibrators were put into the mass the concrete flowed easily. Two admixture tanks are provided. The admixtures are automatically weighed and dropped into the water below.

Cement for the Dorena operation is trucked from the Oswego plant of the Oregon Portland Cement Co. near Portland. The haul requires about 10 hr. to make the round trip. The load is 115 bbl. The cement has a low alkali content (less than 0.6 percent) and develops excellent strengths. A low water cement ratio is maintained on all the types of concrete used as is seen by a study of the various mixes used.

In the tabulated data that follow, the strengths given are for the most part an average figure for a large number of breaks (50 or more). However, generally speaking, the figures for 7, 14, 21 and 28 days represent considerably more numbers of breaks than do the readings 45, 60 and 90 days, and where the number of breaks is small we have made a notation as to the number the average represents:

Mix No. 1 is the mass concrete and is a 3-sack mix and has the following composition:

6-in. to 3-in. cobbles	805 lb.*
3-in. to 1½-in. cobbles	780 lb.
1½-in. to ¾-in. cobbles	540 lb.
¾-in. to No. 4	580 lb.
Sand	870 lb.
Ox mixture	3.0 cu. ft. 3.0 lb.
Water	190 lb.
Slump	1 in. to 2 in.

*These weights are based on material in a saturated, surface-dry condition, and adjustment is made in the actual amount of water added to compensate for moisture conditions of the aggregates.

This concrete shows the following strength characteristics:

7 days	348 p.s.i.
14 days	663 p.s.i.
21 days	1197 p.s.i.
28 days	1211 p.s.i.
45 days	1996 p.s.i.
60 days	2183 p.s.i.
90 days	2778 p.s.i.
6 months	3177 p.s.i. (46 breaks)
1 year	3378 p.s.i. (34 breaks)

Mix No. 3 is a 6-in. "Face" mix, used in the outside forms and has the following composition: It is a 4-sack mix.

6-in. to 3-in. cobbles	810 lb.
3-in. to 1½-in. cobbles	785 lb.
1½-in. to ¾-in. cobbles	540 lb.
¾-in. to No. 4	580 lb.
Sand	840 lb.
Ox admixture	4.0 cu. ft.
Water	187 lb.
Slump	2 in. to 3 in.

The concrete has the following strengths:

7 days	729 p.s.i.
14 days	1225 p.s.i.
21 days	2420 p.s.i.
28 days	3330 p.s.i.
45 days	3519 p.s.i.
60 days	3781 p.s.i.
90 days	4518 p.s.i.
6 months	4584 p.s.i.
1 year	4592 p.s.i. (20 breaks)

Mix No. 5 is called the "3-in. Mix" and it has 4.6 sacks per cu. yd. and has the following composition:

6-in. to 1½-in.	705 lb.
1½-in. to ¾-in.	710 lb.
¾-in. to No. 4	850 lb.
Sand	955 lb.
Ox admixture	4.6 cu. ft.
Water	235 lb. (16 breaks)
Slump	2 in. to 3 in.

(This mix is used in lesser amounts than the two previous mixes.)

The concrete shows the following strengths:

7 days	603 p.s.i.
14 days	1263 p.s.i.
21 days	2017 p.s.i.
28 days	2783 p.s.i.
45 days	3027 p.s.i.
60 days	3131 p.s.i.
90 days	3213 p.s.i.
6 months	4120 p.s.i. (15 breaks)
1 year	4767 p.s.i. (12 breaks)



Controls for batching plant



One of two 2-cu. yd. mixers used at plant

Mix No. 7 is the 1½-in. mix. It is a 5.6 sack mix and has the following composition:

1½-in. to ¾-in.	1425 lb.
¾-in. to No. 4	785 lb.
Sand	995 lb.
Ox admixture	5.5 cu. ft.
Water	260 lb. (10 breaks)
Slump	2 in. to 4 in.

This mix gave the following concrete strengths:

7 days	758 p.s.i.
14 days	1422 p.s.i.
21 days	2370 p.s.i.
28 days	2607 p.s.i.
45 days	2948 p.s.i.
60 days	3488 p.s.i.
90 days	3670 p.s.i. (14 breaks)
6 months	3925 p.s.i.
1 year	4440 (5 breaks)

The aggregates are trucked to the batching plant near the dam and dumped to ground storage under which runs a 30-in. reclaiming belt that is fed through Garlinghouse gates. The gates in the reclaiming tunnel have been provided with a hand wheel and shaft in front of the gate. Two spools have been welded to this shaft and by means of a cable that winds "right hand" on one spool and "left hand" on the other and, with the other ends of the cable fastened to the front and back of the gate, turning the hand wheel in one direction opens the gate and reversing the hand wheel closes the gate. The main inclined belt to the plant has a total length of 867 ft. and rides on Stearns idlers.

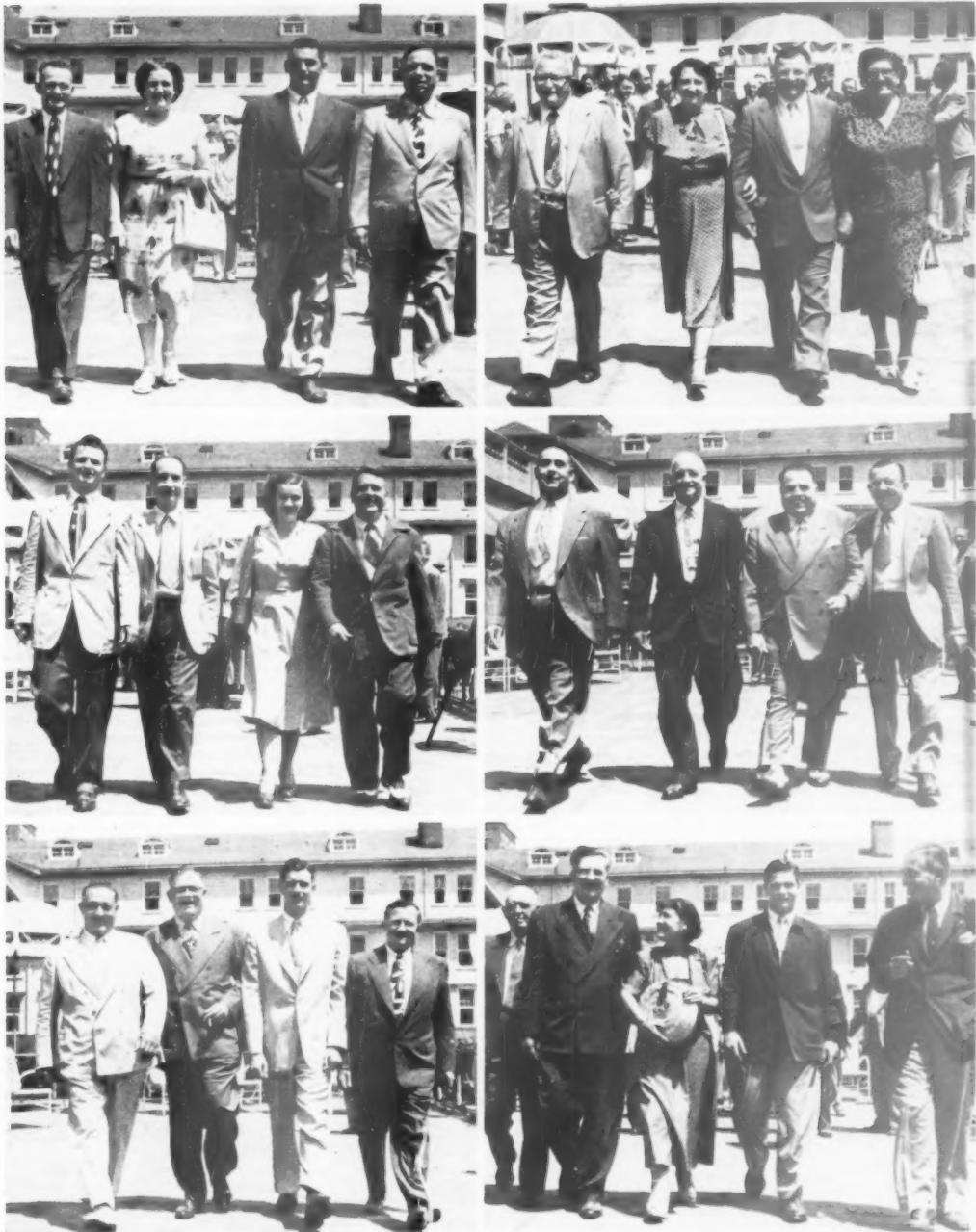
There are five aggregate bins that have the following capacities:

6-in. cobbles	65 cu. yd.
3-in. to 1½-in.	50 cu. yd.
1½-in. to ¾-in.	45 cu. yd.
¾-in. to No. 4	45 cu. yd.
Sand	50 cu. yd.

The concrete, after mixing, falls to an 8-cu. yd. storage pocket that in turn serves three 4-cu. yd. Garlinghouse buckets through air-controlled gates. These buckets ride a flat car that is powered by a Davenport locomotive which hauls the buckets to the dam where cranes lift the buckets for final disposal of the concrete. Two locomotives are available. Air for the Johnson batchers is supplied by a Chicago Pneumatic portable unit that is powered by a Caterpillar D8800.

General information on the Dorena Dam project and the engineers and contractors is published in the article on aggregate production also published in this issue. *

CINDER BLOCK PRODUCERS AT ATLANTIC CITY



Delegates to the National Cinder Concrete Products Association annual meeting, held August 1-3 in Atlantic City, N. J., and wives, stroll down the boardwalk. Top: left to right, Joseph Lucio, Mrs. Lucio, John Fitzsimon and Charles Cericola, Jack Freedman, Mrs. Freedman, Louis Freedman, and Mrs. Freedman. Center: left to right, Don Mother, Allen Miller, Mrs. Howe and Cyril F. Howe, R. I. Lampus, John A. Kuitkem, S. A. Mooney and Joe Nagy. Bottom: left to right, Ralph C. Condo, Eugene F. Olsen, John M. Longenecker and H. H. Longenecker, Elias Follobaum, E. W. Dienhart, Mrs. Paturzo, Sam Paturzo, Jr., and Sam Paturzo, Sr. The convention report appeared in the September, 1949, issue of ROCK PRODUCTS, page 106

Concrete Products Operation Designed In Straight Line

**One self-powered traveling mixer serves a block
machine, a brick machine and two specialty
units at Dunbrick Co., St. Petersburg, Fla.**

FLORIDA and the East coast and California and the West coast vie with each other in catering to the tourist trade and both sections are growing steadily. The growth on the West coast, while probably not as flashy or spectacular as some parts of the East coast, seems to be a steady one with probably a larger percentage of the newer arrivals being there for the purpose of establishing a permanent home and to live there the rest of their lives. Large numbers of people who have retired from active business are taking advantages of the climate that the West coast has to offer. The Tampa-St. Petersburg area in Florida also has many business and industrial attractions. An excellent harbor, a back-country of extensive citrus groves, the largest phosphate producing area in the world—to mention a few of the territory's assets—all account for their share of the attractions the district has to offer.

The use of concrete block made from sand, limrock, expanded slags and similar materials is widely accepted. Homes, large and small, auto courts, apartments and business houses all use concrete block to a large degree and the buildings that we have examined in the area that are made of these materials are architecturally attractive, free from wall cracks, and would be an asset to any state.

The Dunbrick Co. at St. Petersburg is in the latter phases of a rebuilding

program so as to help supply the needs of the customers in the area served. Ted Clarkson started the block business in 1935 so has a background of experience from which to draw. Elbert Bryan, production manager, started with the company in 1936 and became a partner with Mr. Clarkson in 1944. The new plant is built around the idea of using multiplicity of block



Temporary skip arrangement discharging to traveling mixer

producing units, each unit for specific purpose. This gives the plant a flexibility and a continuity of operation that most plants lack, and it is our ob-



A much-used and convenient item of equipment at this plant is the masonry saw, shown here

servation that Mr. Clarkson is setting a trend in concrete products manufacture that can be watched with interest. On one hand there are the plants with large capacity units, against the plants of equal capacity but where several smaller machines are used.

The plant is laid out in a single line and four machines are assembled along this line. At one end the bins for aggregate and bulk cement along with batching facilities are located. These are at sufficient elevation that a traveling mixer can go under the batching equipment, receive its load, and then travel over the top of any of the four machines and there dump its concrete to the steel hoppers at each production unit. The mixer has a capacity of 42 cu. ft. and is mounted on flanged wheels that ride an elevated, wide spaced, industrial rail system. The unit is electrically driven and carries the motor that also drives the mixer blades. The operator, from an elevated platform, can control all the



Concrete brick machine with a capacity of 1800 brick per hr.



The new semi-automatic block machine with a capacity of 2300 modular 8-in. block per 8-hr. day

steps in the mixing, transporting, dumping, etc., phases by a series of push button controls. The equipment for this interesting and novel mixing and transportation system was supplied by the Concrete Transport & Mixer Co. of St. Louis, Mo.

At the time of inspection, due to construction work still going on, the aggregates were being unloaded to ground storage by a Farquhar car unloader. The new work revolves around the completion of a track hopper, and the aggregate then will be unloaded to this hopper and transported to the steel bins over the batching equipment. A Robins conveyor is being installed for this work. At present, the mixing cycle is as follows: the traveling mixer receives its cement from one of two gates. The mixer then is moved a short distance where a vertical skip dumps the coarse aggregate and sand to the mixer. Water is then added from a spray and with the mix completed, the traveling mixer is moved over the desired machine.

Block Machine

The heart of the block producing plant is a new Lith-I-Block machine and it is the first in the line of travel for the mixer. Next are two Appley machines for specialty work, and at the end of the line is the Dunbrick concrete brick machine. All the structural work related to the plant is of steel and the floors are of concrete. The Lith-I-Block machine is turning out 2200 to 2300 of the standard 8's per 6½-hr. working day. The Dunbrick unit can turn out 1800 bricks per hr. All the green block and bricks are cured under cover with transportation of the racks accomplished by a Clark lift truck. Several hand trucks also are available for this work. A stone saw is on hand for trimming on cutting work.

The Lith-I-Block machine has been in operation since October, 1948. It is a compact machine and occupies a relatively small amount of floor space. Plain steel pallets are used and the



Aggregate is transferred from railroad cars, left, by a 1-cu. yd. clamshell to the overhead, 3-compartment bin. An addition to the bin is on order that will more than double its capacity. Bulk cement, delivered by rail, is transferred to the overhead bin of 450-bbl. capacity by a conventional screw conveyor and bucket elevator method

machine is semi-automatic with controls centering in the off-bearing fork, the use of which enables the operator to lift two pallets at one time (four standard 8's), and at the same time to control all the machine's operation. Vibration for the machine is supplied from two small Reliance electric motors, one on each side of the mold box and operates through Link-Belt roller bearings. Vibration on both sides is said to give more uniform compaction.

The plant is served by the rails of the Atlantic Coast Line Railroad.



Traveling mixer dumping to hopper serving block machine

Modern Batch Plant

J. C. BREMER has built a ready-mixed concrete plant (shown above) at Litchfield, Ill., which is said to be the first of its kind in that area. Bulk cement from railroad cars received in shipments of 250 to 415 bbl., discharges to an under-track conveyor hopper from which a 9-in. screw conveyor, designed and fabricated by Mr. Bremer, transfers the cement to a bucket hoist which delivers the material to a 450-bbl. Butler bin.

Coarse aggregate unloaded from open-top cars by a 1-cu. yd. Orton crane discharges into the top of a Johnson 2-cu. yd. batcher bin. At present the bin holds 30 cu. yd. but a 70 cu. yd. extension has been ordered.

The bin is subdivided into three compartments; one each for coarse aggregate, medium-sized aggregate and sand. Four trucks are used to distribute the concrete: two 3-cu. yd. Smith mixers, one 2-cu. yd. Jaeger, and one 2-cu. yd. Rex.

At present ready-mixed concrete is sold at the price of \$12.75 per cu. yd. in batches as small as 2 cu. yd. and is delivered at standard plant price within a radius of three miles.

Mr. Bremer plans to consider the use of local newspapers for advertising the advantages of ready-mixed concrete to home owners making repairs, and contractors pouring foundations and basements.



Plant building, center, flanked by yard storage of two-core modular block. Note offset block wall on rear of office building, left

Diversify to Expand Concrete Masonry Production

Pumice Building Materials, Inc., Lubbock, Texas, produces two-core modular block; develops large radius bullnose unit; pumice stone veneer for commercial buildings and pilaster block of original design

PUMICE BUILDING MATERIALS, INC., situated in the booming new city of Lubbock, Texas, has a market area nearly 150 miles in radius. Started early in 1946, the firm has been engaged exclusively in the manufacture of pumice concrete masonry units since its organization. When production was first started, 8- x 8- x 16-in. units were produced, but due to the resistance of local blocklayers, production was switched to a 5- x 8- x 12-in. block. About a year later, the blocklayers began demanding the larger 8- x 8- x 16-in. modular block because they had learned for themselves the ease and speed with which the bigger lightweight unit could be laid up. Production was then switched back to the larger block which has now become standard throughout the territory. During its comparatively short operation, the firm has developed a number of unique and unusual blocks which are gaining popularity in the building trade.

Develop Unusual Block

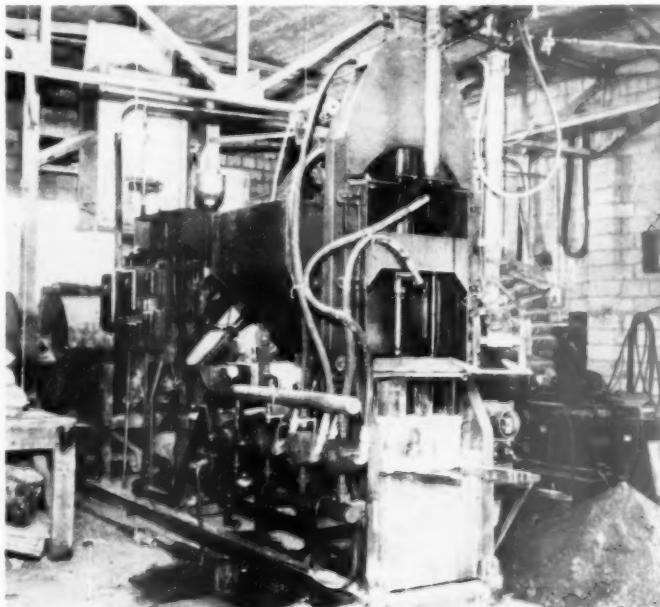
All block produced are sold under the trade name of Gibraltas Pumice Blocks and are of two-core rather than three-core type, with solid square ends. The two-core design was adopted to facilitate wiring and plumbing which can be placed in the hollows thus dissuading plumbers and electricians from smashing the walls in order to make a place for pipe and wire. Also, it was felt that the two-core system gave greater strength to the wall as the head joints would be located over solid masonry and have more support.

On all bullnose block, the radius

has been increased from a normal 2-in. radius to a 4-in. radius. This increase is said to give a much better appearance to all bullnose block and serves to beautify the appearance of the building as a whole. In addition

to the ordinary steel-sash casement block, a double-hung window block is manufactured that will conform with all standard double-hung steel and aluminum windows.

An imitation rock-faced pumice



Fully-automatic block machine that is operated hydraulically. This machine has been designed and built by General Pumice Corp. specifically for the manufacture of pumice masonry

stone veneer unit is slowly working its way into popularity as a front for commercial buildings of all types. Recently, the veneer mold was redesigned so that the three different sizes produced are nearly modular and can be laid up in random fashion. This veneer is now made in 4- x 2½- x 24-in., 4- x 5- x 24-in. and 4- x 8- x 24-in. sizes.

A pilaster block of original design is said to be a favorite with all architects and contractors because of the saving in costs since no forming has to be done and the wall, to outward appearance, is built of one material. The pilaster block consists of a main body 8- 12 x 16 in. with an 8- x 8- x 8-in. extension, thus making the total length of the block 24 in. The large pilaster core measures 9 x 11 in. When the pilaster is used in an 8-in. wall, there is a 4- x 16-in. projection either on the interior or exterior of the building. By reversing the direction of the extension from left to right on each course, the pilaster bonds out perfectly. A patent for this block has been applied for and should be granted shortly.

Pumice Aggregate

Pumice Building Materials, Inc., is located on the Santa Fe railroad and has its own spur. Pumice is shipped to the plant from the parent corporation, General Pumice Corp., Santa Fe, New Mex., in hopper-bottomed cars and is unloaded by means of a conveyor belt located just below track level. The belt carries the pumice to a below-ground-level hopper from which a bucket elevator transfers the pumice to a small overhead hopper. Excess pumice is diverted by means of a chute from the overhead hopper to below-ground level storage pits. Pumice is reclaimed from the pits by means of a drag scraper and elevated to the overhead hopper by the bucket elevator. The plant was designed in this fashion in order to eliminate, insofar as possible, a large number of overhead steel hoppers, as the plant was built during the steel shortage. The below-grade storage pits were designed to prevent erosion of the pumice by the high Texas winds.

From the overhead hopper, pumice falls by gravity through a chute to a volume batcher. The mixer operator releases the pumice into the mixer and adds 50 percent of the water



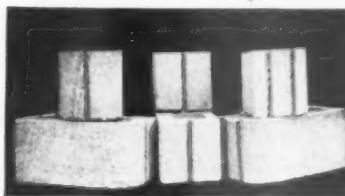
New office building, top, showing rock-faced pumice stone veneer on front, offset block design on end wall and pumice concrete roof slab. Bottom: private home in Lubbock, Texas, featuring "squashed joints"—a type of wall construction developed in the west that yields a rough, extruded joint. Wall around the building is of pumice stone veneer

required for the mix. Pumice and water are premixed for two minutes and then cement and the remaining 50 percent of water are added, with the mixing continued for an additional five minutes. The mix is carried by means of an elevating belt to the machine hopper. The mixer and block machine are on the same level for economy in building requirements. In

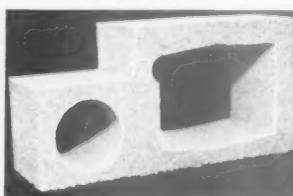
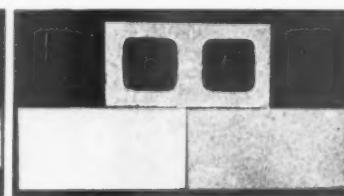
recent weeks a second mixer has been installed in order to enable the mixing capacity to keep up with the production of blocks. Only sacked cement is used. Block production is now 4000 8- x 8- x 16-in. equivalent units per 8-hr. day.

The block machine, a hydraulically operated unit designed and built by

(Continued on page 158)



Left: Typical window block produced by Pumice Building Materials, Inc. Left, bullnose steel casement block; center, square steel casement block; and right, bullnose double-hung window block. Center: Regular 8- x 8- x 16-in. block. Note two-core design. Right: Pilaster block



Lightweight Aggregate From Expanded Slag

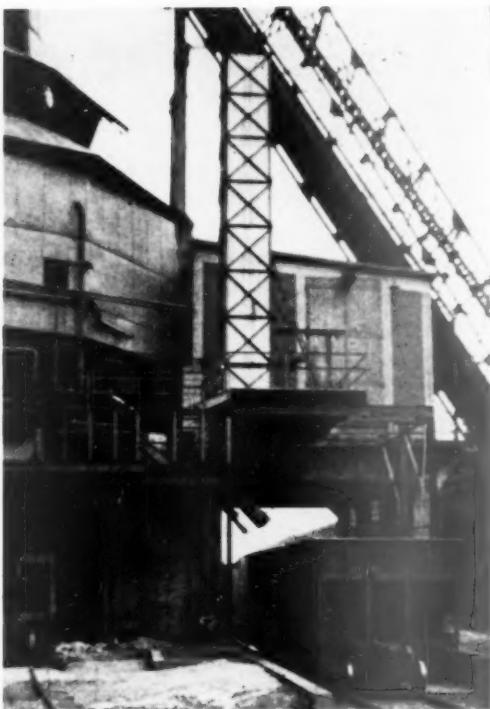
Lone Star Steel Co., Lone Star, Texas, uses rotor-type expansion machine with water-cooled side plates, table and cone

ONE OF THE most modern plants in the United States for manufacturing lightweight expanded slag aggregate began operations June 1, 1949. Lone Star Steel Co., Lone Star, Texas, has been considering the installation of a plant for making and processing expanded slag aggregate for the concrete industry for several years. After carefully surveying many such plants in the country, the company's engineering department worked out what is believed to be the most compact and efficient unit possible.

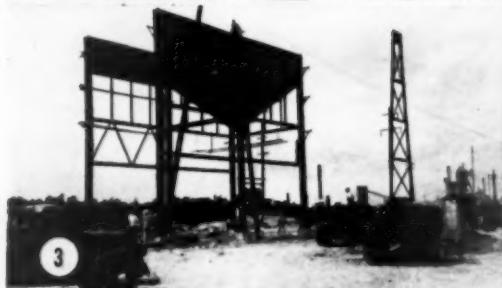
The plant has been established in two stages. Expansion of the slag takes place at the furnace and the clinker is transported to another site, a 1/2-mile distant, for crushing and grading. There is no dust from the crushing process to disturb and interfere with the efficiency of the furnace operation and in addition, the process

Lower part and foundation of 50 t.p.h. sintering machine that is a rotor type with water-cooled side plates, table and cone

is so flexible that neither a furnace shut-down nor a crusher break-down will affect the other part of the operation.



Sintering machine used for production of the slag is a Caldwell B machine having a capacity of approximately 50 t.p.h. and connected directly



No. 1: Track hopper and reclaiming belt conveyor. Note neat construction of reinforced concrete hopper and grizzly. No. 2: Looking toward sintering machine down chute from furnace. No. 3: Overhead storage hoppers with double compartments of 150-cu. yd. capacity each. No. 4: Surge pile between conveyors Nos. 1 and 2

to a slag chute at the discharge end of the furnace. The machine is rotor type with water cooled side plates, table and cone. It is driven by a 100-hp. motor and is completely self contained.

Clinker, as it emerges from the machine in the form of a coarse, cellular material, impinges on a target plate which is hung directly over railway cars spotted to take the clinker as it drops. Sides of the cars are cooled with water-spray jets to prevent buckling or other heat damage. As cars are loaded, they are moved out of the loading zone with a car puller, which also moves the next empty car in. Each morning the cars loaded during the night are switched to the crushing plant for processing the clinker. The furnace is set up for one-man operation on each shift. Available slag from this furnace is about 600 t.p.d.

When transferred to the crushing plant, cars are spotted over a track hopper, about 20 ft. sq., the top of which is grated with grizzly bars. As the cars dump, material falls to the receiving hopper where the grizzly sizes it to minus 12 in. A 30-in. belt conveyor on approximately 160-ft. centers reclaims material from the track hopper, elevating it 43 ft., where it is discharged to build a surge pile over another receiving hopper. A plate feeder recovers material from this second hopper, discharging it to a 24-in. belt conveyor on 120-ft. centers which carries the expanded slag to a scalping screen. All minus 2½-in. material is directed to finished product screens mounted over storage bins. All rejected material (plus 2½, minus 12 in.) is chuted into a jaw crusher.

Final Screening

At the final screening station over the storage bins, material is separated into three sizes: ¼ in. to dust; ½ to ¾ in.; and rejected material, plus 2½ in., which is sent to a 24- x 40-in. secondary roll crusher. The two smaller sizes are chuted to bins of 150-cu. yd. capacity each, from which material is loaded to railroad cars.

Advantage of the surge pile lies in the fact that if the crushing equipment should have to be shut down, expansion at the furnace need not be curtailed as clinker can still be manufactured and stored for future crushing. This same advantage works in reverse: if the furnace should be shut down through mechanical failure or lack of coal or ore, there would be enough surplus clinker to keep the trade supplied for a reasonable time.

Design of the crushing and screening plant was made by the Lone Star engineering department to get the highest efficiency and the most constant production possible. The entire installation is ideally situated for maintenance, being open and readily accessible. W. R. Bond, general manager, Lone Star Steel Co., and D. B. Hooser, plant engineer, made a study of a number of existing expansion



Loading car with expanded slag. Note water spray alongside car for cooling purposes

plants before designing the present operation.

Celocrete lightweight aggregate, the trade name for this expanded slag, is produced and marketed by the Lone Star Steel Co. under license of The Celotex Corp., Chicago, Ill. Production from the Lone Star plant supplies the

concrete block plant market in the Texas, southern Arkansas, southern Missouri and western Louisiana area. The product is enjoying a constantly increasing popularity among builders due to such advantages as lower handling costs, fire safety, heat insulation and noise absorptive qualities.

Large Ready-Mix Plant Opened in South

T. T. WILSON READY MIXED CONCRETE CO., Chattanooga, Tenn., has started operations with a capacity of 180 cu. yd. per hr. The new plant is said to be one of the largest and most modern in the South. The layout is arranged to receive sand and gravel in an under track hopper, either by railroad cars or by truck. The aggregates are elevated to the central batching plant by means of three 24-in. belt conveyors. The first, in addition to transferring to the second conveyor, can also discharge into trucks. At the second transfer point a swivel chute, with a complete circle turning radius, has been installed to transfer to the third conveyor, or is used to stockpile sand and gravel.

The third conveyor discharges into another swivel chute located at the top of the plant, which chute, controlled from the batch floor, directs the flow into either of five aggregate compartments. The combined capacity of these five compartments exceeds 400 tons. The plant is designed for bulk cement. The cement tank is located centrally between the aggregate compartments and has a capacity of 800 bbl., divided in two sections. Valves, controlled from the batcher floor, direct the flow of cement into either section of the storage tank.

Using a system of magnetic contractors, an interlocking system has been installed which automatically stops the cement bucket elevator in the event of shutdown of the screw conveyor. Suspended under the aggregate bins and cement tank is a 3-cu. yd. concentric batcher. This batcher can be charged from either of the five aggregates storage compartments and

from either cement storage compartment. All weights are accurately controlled through special over and under indicators. Batches are discharged through a chute into transit mixers. Water is measured.

The plant is of the Octo-Bin type manufactured by the C. S. Johnson Co. Deliveries of concrete are made by a fleet of 2½- and 3½-cu. yd. Jaeger mixers mounted on International trucks. Leland Biggs is president and sales manager of the company, and Homer Mason is plant superintendent.

Placing Pipe Underwater

UNIVERSAL CONCRETE PIPE CO., Columbus, Ohio, has announced development of a concrete river weight said to be easy to handle and economical to install, yet efficient in the job of weighing down under-water pipe. The new weights are of rounded construction, providing for quick and easy handling as they allow the pipe to roll or twist while being laid. Handling is facilitated also because the weights are in two sections, which are bolted together after encircling the pipe, the manufacturer states. A special lifting hole is a convenient feature.

Proportioning Concrete

NATIONAL CRUSHED STONE ASSOCIATION has announced the availability of a revised edition of the booklet, "The Proportioning of Concrete," prepared by A. T. Goldbeck and J. E. Gray. Principal purpose of the revision is to take into account the advances in concrete technology represented by air entrainment.

Filler Block Floor System

Large school projects in Tennessee being built of new precast concrete system as supplied by Southern Cast Stone Co.

THE F & A FLOOR SYSTEM, of which the Roy Darden Industries, Inc., Atlanta, Ga., is exclusive agent, has been accepted by many leading architects throughout the Southeast, especially so in the Greensboro, N. C. area, where the Arnold Stone Co. is in production, and in the Knoxville, Tenn., area, where Southern Cast Stone Co. is in production of this effective and economical floor or roof system. The illustrations shown herewith were all taken at the Carter high school, Knox County, Tenn. Barber & McMurry were the architects and Daugherty & Waters, contractors. The job entailed some 28,000 sq. ft. of flooring. Another job involves 128,000 sq. ft. for a new school, including floor and ceilings, which job had not been let to a contractor at the time of this writing.

In the Oak Ridge atomic energy section, the Southern Cast Stone Co. is supplying the concrete masonry units for 500 houses and 29 other apartments that will provide for 450 additional housing units. The apartments are being built by Merritt-Chapman and Scott, and the houses by John A. Johnson & Sons. Materials being supplied include precast door and window lintels, sills, etc. The company can produce up to 30,000 standard 8- x 8- x 16-in. units per 24 hr. day. A rebuilding and alteration program has been recently completed to bring capacity up to this point.

Nearly completed floor section will be covered with wire reinforcing after which a slab of concrete (3000-lb. minimum strength) will be poured over the area

F & A floor systems are being sold to the architects and contractors through vigorous and effective sales campaign being conducted by the Roy Darden Industries, Inc., through direct mail, advertising in trade publications, and through personal contacts by Roy Darden. To better serve and expedite this educational campaign, Mr. Darden uses his own airplane to make distant trips to contact architects, contractors, etc.

Floor System Details

The F & A system is a combination of precast concrete joists, a filler block, and a poured-in-place reinforced concrete slab. It is named after Formigli Brothers, Inc., Philadelphia, Penn. and the Arnold Stone Co. of Greensboro, the two companies which, together with the Southern Cast Stone Co., formed their own research organization to develop precast concrete units. The floor system is one of the products developed by F & A Laboratories, and Roy Darden Industries, Inc., has the exclusive sales right. The system is licensed to concrete masonry plants on the basis of area rights with payments on a unit basis.

The joists that are a part of the system are "T" shaped and poured in the inverted position in steel forms of conventional design. Floors may be designed to carry any necessary su-

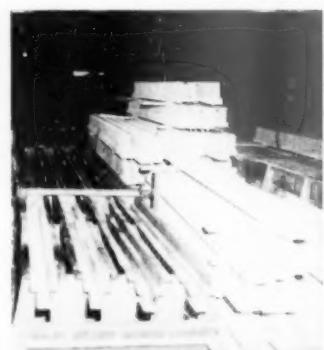
perimposed loads for any span, subject only to the conditions used in standard reinforced concrete design. Obviously the construction offers a fire-proof design and, when used with cinder, Superrock or other lightweight and porous aggregates, provides excellent acoustical and thermal insulation.

The construction of a floor section is very simple. The joists are laid on proper centers, 24-in. to 28-in. centers being most common. These joists are shored up near the center of the span with suitable caps and posts, after which the filler block are laid in place. A web of reinforcing rods or wire is then laid over the section and two or more inches of 3000-lb. (minimum) concrete is poured over the wetted block and beams. After the concrete slab has been aged sufficiently, the wood shoring below is removed. The filler block can be made on any type

(Continued on page 158)



Under section of a floor. Temporary wood supports will be removed later after the concrete slab has aged sufficiently



Steel forms, left, are used in casting concrete beams for floor system

NEW MACHINERY

Rigid Masonry Saw

MARTIN FIREPROOFING CORP., Buffalo, N. Y., is now producing a masonry saw that is said to offer many exclusive features, including a built-in



Masonry saw with patented, adjustable cutting table

dust collector on some models; a self-priming pump and four water jets for wet cutting and a pivoted arm that carries all working parts of the blade assembly. The saws are available in four models, ranging in blade size up to 14 in. and in power units up to two 1½-hp. motors on the model ADF, which includes dust collector. Blades are available from the machine manufacturer, and include several types of abrasive blade as well as a diamond blade for wet cutting.

Fluid Drive Scoop

MIXERMOBILE MANUFACTURERS, Portland, Ore., has announced the adaptation of Chrysler fluid drive to the Wagnermobile Model "C" Scoop, claiming the first unit in the materials

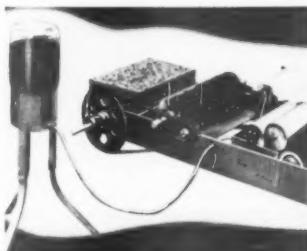


Portable loader with fluid drive

handling field to have fluid drive. The unit is designed for those operators desiring a lightweight, fast, portable loader for yard work and general materials handling, the manufacturers state. The new unit has scoops in five sizes and many other attachments including ¾-cu. yd. concrete hopper, crane boom, and lift forks. Load lifting capacity is 4000 lb. Hydraulic controls fold down the top section of the hoist track giving an overall height of only 98½ in. for work with low overhead clearance. The track reaches a height of 26 ft. with standard track extensions. The scoop with fluid drive has power steering, hydraulic controls and is powered with the Chrysler industrial 8-cyl., 114-hp. engine.

Pallet Oiling Unit

BERGEN MACHINE & TOOL CO., INC., Nutley, N. J., has announced the BMT Pallet Oiler, designed for use with 26-in. pallets. The unit has an 8- x 26-in. steel brush for removing loose concrete from the pallet before it passes under the oiling roller, and derives its power from the block ma-



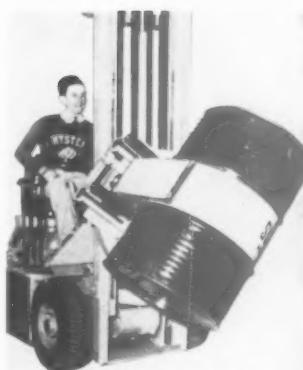
Pallet oiling unit powered from block machine

chine. Three hardwood oiling rollers rotate only when a pallet comes in contact with them, the oil being supplied by a 5-gal. glass bottle which is inverted into position on a stand supplied. The oil tank is removable.

Attachment for Turning Lift Truck Loads

HYSTER CO., Portland, Ore., has made available a revolving apron attachment which has been designed for the turning over or dumping of lift truck loads by a hydraulic mechanism. The attachment, which is made for the Hyster "20" and "40" (2000- and 4000-lb. capacity) lift trucks, consists of a revolving head or turn-table on which conventional fork arms are mounted, turns 180 deg. in either direction from center, and is said to efficiently handle capacity loads of 1725 lb. with the "20" and 3650 lb. with the "40."

A feature of the attachment is that a special load-grab unit may be mounted on the turn-table of the "20" lift truck in place of regular fork arms. The load-grab side-squeezes



Revolving apron attachment for turning or dumping loads

loads with sufficient pressure to lift securely without the need of any type of pallet, and has a number of optional arms which may be substituted for standard load arms as desired. The optional arms are designed to handle such unit packages as bales, boxes, drums, barrels, etc. Load capacity of the apron in conjunction with the special load-grab unit is 1400 lb.

Clamshell Bucket for Lift Truck

HYSTER CO., Portland, Ore., has added a clamshell bucket of ½-cu. yd. capacity for a lift truck to its line of load-grab attachments for specialized materials handling. The unit is available only for the Hyster "40" (4000 lbs. capacity) lift truck, and mounts on the sliding supports of the basic load-grab as optional equipment. It is operated by a lever at the driver's right, and opens and closes by means of the same hydraulic power which spreads and contracts the arms of the standard load-grab (palletless materials handling attachment). The bucket has a standard lifting height of 8½ ft. (to the bottom of the closed bucket).



Clamshell bucket attachment for lift truck

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offers you a choice of 18 shades—6 Reds, 3 Greens, 3 Browns, 3 Yellows, 1 Black, 1 Blue and 1 Orange. Each shade is manufactured to meet the most exacting specifications for cement work as recommended by the American Concrete Institute and the Portland Cement Association.

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Write today for color samples and complete technical information on how cement and mortar colors may be used for improved results. Address Department 10, C. K. Williams & Co., Easton, Pennsylvania.



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Diversify Production

(Continued from page 153)

General Pumice Corp. specifically for the manufacture of pumice masonry units, is a plain pallet stripper with an automatic pallet-feed. It incorporates a recently developed method of super-imposed vibration.

All operations of the machine—filling, stripping and feeding—are accomplished hydraulically and are controlled by the machine operator by means of valves. Vibration is controlled automatically by the movements of various components of the machine. Finished block are removed from the front of the machine by a pneumatic offbearer and placed on racks which are carried to the steam room on hydraulic hand dollies, 48 block to the rack.

Block are cured for 12 hr. with live steam at a temperature of between 170-180 deg. F. Steam pressure and temperature are controlled automatically, as well as the curing period. The block are allowed a soaking period before being removed from the steam room with a Hyster truck, cubed into 50-unit cubes and stacked.

Merchandising

Block are sold directly from the plant and also through the medium of dealers in the surrounding territory. The company hopes to extend its dealer coverage and eventually to sell only through dealers.

As pumice block is a recent entrant into the building field in this area, a very extensive educational advertising campaign is being conducted through the newspapers, radio and by direct mail. The future business picture looks bright. The only troublesome factor in the operations thus far has been the cement shortage.

Cement is stored in a tent. This type of storage is experimental but because of flexibility and portability inherent in its design, much is expected of the tent method of storage in this climate. A new type of catenary tent is used that has been developed by General Textile Mills, Carbondale, N. Y., measuring 40 x 31 ft. with no interior poles and a 10-ft. minimum clearance.

Filler Block Floor

(Continued from page 156)

machine and several designs are available.

In a test conducted by the Pittsburgh Testing Laboratories, a panel having a clear span of 20 ft., 4 in. was constructed 6 ft. wide using the specifications of the F & A floor system, and load was applied with full cement bags in a balanced pattern to a maximum of one and one-half the design load, plus one-half the dead load. Maximum deflection after 24 hr. of loading period was .457 in. or 1/534th of the clear span with a recovery of 71.7 percent after 24 hr.

The offices of the Southern Cast Stone Co. are located at the plant. J.

W. Warren is vice-president of the firm and M. R. Warren is general superintendent. Ed Welch is outside salesman.

Central-Mix Plant

C. F. LYTHE AND AMIS CONSTRUCTION Co. are supplying central-mixed concrete for Medicine Creek Dam, near Cambridge, Neb., using a fleet of



Dump body for hauling bulk cement

Dumpcrete units. About 35,000 cu. yd. of concrete are called for in the contract.

Three 4-cu. yd. Dumpcretes are transporting the concrete from the central mixing plant to the job site. A steel cover with a loading door has been added to a fourth Dumpcrete body, as shown in the illustration, which is used to haul bulk cement from the railroad to the central mixing plant, a distance of nine miles. This unit hauls approximately 40 bbl. of bulk cement per load and averages 12 trips per day.

Cement-treated Base

CONSTRUCTION of the \$245,000 New Philadelphia Municipal Airport in Pennsylvania has been started with the pouring of concrete for the 4000-ft. hard-surfaced runway. The project, when completed, will include the 4000- x 100-ft. runway, two taxi strips, a 150- x 600-ft. apron, two sod runways and a complete lighting system for night flying.

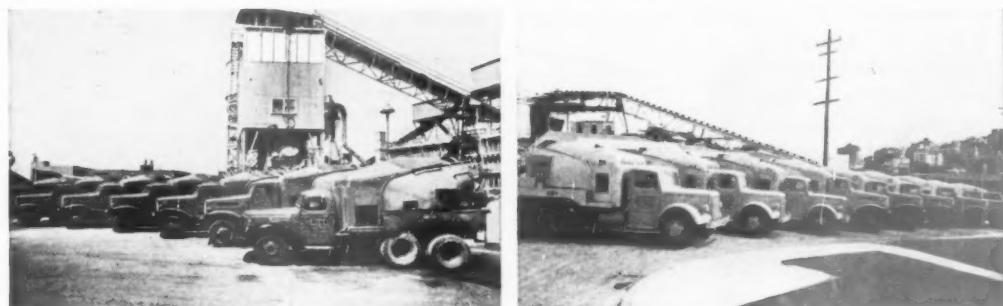
The runway is being made with a 6-in. cement treated base and a 2-in. asphaltic concrete top. The base is said to be a new development in hard surface road and runway projects, and cuts the cost of installation by approximately one-third and retains up to two-thirds the strength of concrete of the same thickness. It was developed by Portland Cement Association.

When completed, the runway will be able to take a wheel load of 30,000 lb. or a ship load of 72,000 lb.

the truck mixer fleets that grow are Jaegers



because Jaeger dual-mixed, specification

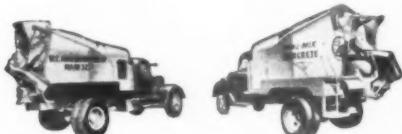


concrete is acceptable on any and all jobs . .

Experienced ready-mix operators know that their \$200,000,000 a year business was built by furnishing a high quality product, mixed to close specifications, accurately controlled for slump, and delivered without segregation over long or short hauls.

The majority of successful plants—and the new plants that will prove successful—insure the acceptable quality of their product by using Jaeger Dual-Mix Truck Mixers.

Because they produce uniform higher strength concrete, with a larger daily payload average and lower cost of maintenance, more concrete is sold in Jaegers than by any other method. The Jaeger Machine Company, Columbus 16, Ohio.



Sizes 2-3 to 5½-7½ cu. yd., including all standard Truck Mixer Bureau ratings. Top or end loading type—as best fits your needs. Ask for Catalog TM-8.



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Lightweight Aggregate from Texas Shale

FEATHERLITE, a lightweight aggregate made from shale formerly deemed worthless, has brought the community of Strawn, Texas, back to life and given it a new industry. The lightweight aggregate is processed from Strawn shale, one of the few such shale outcrops in the state.

This shale is found in a layer more than 100 ft. thick directly above the Strawn coal strata, which formerly made the town a coal mining center. When coal was being mined, the shale was dumped as waste. Fires that subsequently broke out in the old dumps proved that the shale could be expanded by heat, thus forming a lightweight aggregate.

The Featherlite Corp. was started by Jack Frost, geologist and oilman, to take advantage of this shale deposit as a means of meeting the demand for lightweight aggregate. Home office of the company is in Dallas, and plans are being drawn for construction of other plants in Dallas and Houston. Production of the aggregate starts as an open-pit operation. The shale is crushed and graded to insure its receiving uniform heat as it passes through the 6- x 60-ft. dia. rotary kilns. Kilns operate at temperatures up to 2500 deg. F. Cooled clinker is crushed to various gradations, and after final screening, is ready for market.

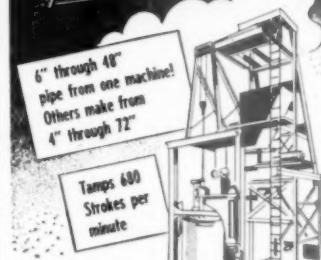
This material meets the requirements set by the United States Bureau of Mines for aggregates. A Bureau of Standards test showed Featherlite aggregate to have a crushing strength of 2121 p.s.i., while ten other lightweight aggregates averaged only 404 p.s.i. Featherlite concrete weighs 60 to 100 lb. per cu. ft., depending on the design of the mix. In addition to structural work, it can be used for concrete block, roof decks, floor slabs, walls, beams, joists and refractory units.

Set Deadline for Entering Noble Award Competition

NATIONAL CONCRETE MASONRY ASSOCIATION will accept entries for the Thomas W. Noble Award until December 1, 1949, the association has announced. The award is presented for the idea or suggestion which, in the opinion of the judges, is the most meritorious contribution to the advancement of the industry. To be eligible for the award, the suggestion or idea must be submitted in writing and must pertain to some phase of the concrete masonry industry. Only regular association members, either owners, co-owners, or any one employee or a group of their employees may enter, and past presidents of N.C.M.A. shall be the judges. Winner of the award will be announced during the annual meeting to be held February 6-9 at the Stevens hotel, Chicago, Ill.

Universal

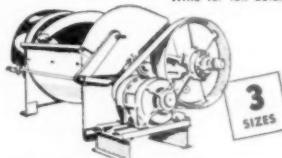
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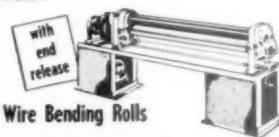
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Texas Masonry Producers Organize

TEXAS LIGHTWEIGHT CONCRETE MASONRY ASSOCIATION has been organized at Austin, Texas, by 15 producers of lightweight concrete masonry products, and six producers of lightweight aggregate. John P. Sheehan, El Paso, was elected president of the group, and Roy McCandless, former president of the National Concrete Masonry Association, was elected honorary member and director. Other of-



John P. Sheehan

Sieve Size	R.D.	B.R.	H.R.	L.	Total % Retained X	Range
3/8	0	0	0	0	0	0
4	0	0	0	2	25	20-30
8	2	25	2	30	45	35-50
16	35	58	16	66	62	54-69
30	61	76	45	81	75	70-80
50	74	86	69	88	85	79-87
100	82	92	82	92	92	96-92
F.M.	2.54	3.37	2.14	3.65	3.84	3.46-4.18

ficers and directors chosen were George A. Neihaus, vice-president; Robert Brown, secretary-treasurer; and George W. Black and A. J. Clark.

Gradations of Screenings for Block

NATIONAL CRUSHED STONE ASSOCIATION, in a short discussion of gradations of screenings for block, states that there are two principal sizes which affect the quality of block, namely the quantity of material retained on a No. 4 sieve and the quantity passing the No. 50. The sum of these two quantities should equal about 45 percent of the total. The balance of the material should be uniformly graded. Generally, there should be approximately 25 percent of material retained on the No. 4 and 20 percent passing the No. 50. About 8 to 12 percent of the total weight of material should pass the 100-mesh sieve. Too much minus 100 material results in a soft block which is undesirable from any viewpoint. Too little plus 4

material results in a block of low strength and also presents difficulties in molding.

Presented above is a table showing gradings in use and a desirable grading (X) which may be used as something to aim for in preparing screenings for use in block. There also is shown a limiting range in gradation, necessary for uniformity.

Bituminous Concrete Group Seeks Charter

THE BITUMINOUS CONCRETE ASSOCIATION OF PENNSYLVANIA has applied for a non-profit charter stating that its purpose is to stimulate and advance the general welfare of the bituminous concrete industry within the Commonwealth of Pennsylvania.

Incorporators are: J. P. Eyre Price, president; Harlan Conly, secretary and treasurer; William K. Allen, Elvin W. Overdorff, John Rice, Jr., and Joseph L. McGlynn. Frank R. Webb is vice-president of the association, but not an incorporator.

A PROSPECT Inquires—USERS Reply

about the KENT Lintelator



★ A few of many replies from users of the KENT Lintelator to a block maker considering the purchase of one.

All are well pleased. All are making and selling more lintels than before. All obviously are making increased profits.

You, too, can increase your sales and profits. Write for information.

★ "The Kent Lintelator is very good for Celocrete lintels."

"Before we purchased our Lintelator we made 20 to 30 lintels a day with two men. Now we make 60 to 75 with one man. The texture now conforms to the block."

Yours very truly, THE CLEVELAND BUILDERS SUPPLY CO.
Cleveland, Ohio

Signed: R. V. Reiner, Supt. Hugo Plant.

★ "We've been using the Lintelator for two years. Our production on lintels has been greatly improved. I think it was a good buy for us."

Very truly yours, CONCRETE PRODUCTS CO.
South Bend, Ind.

★ "We have found our Lintelator very satisfactory. It is simple in operation. Our man makes about 10 lintels an hour."

Sincerely yours, GENERAL BLOCK & SUPPLY CO., INC.
Dearborn, Mich.

Signed: Thaddeus J. Stalmack, Pres.

★ "We make our lintels of Haydite which is very little different from cinder aggregate. Our Lintelator does a swell job and speeds production. We wouldn't consider being without it."

Sincerely, KANSAS CITY CONCRETE PIPE CO.
North Kansas City, Missouri

Signed: Gus Main, Pres. & Gen. Mgr.

★ "After a year's operation of our Lintelator we have more than tripled our sales of pre-cast lintels. It makes a good lintel and makes them fast. The air hoist is a big factor in speeding production. We highly recommend this machine. You'll make no mistake should you decide to purchase one."

Very truly yours, MARTIN BLOCK CORPORATION
Lansing, Mich.

Signed: Wayne R. Martin.

★ "We are well satisfied with our Lintelator after a year of service. We made approximately 500 lintels per week last year and had practically no troubles or maintenance expense. It is simple to operate and to change lengths and widths."

Yours truly, CINDER BLOCK, INC.
Detroit, Mich.

Signed: A. V. Lecco, Production Mgr.

The KENT MACHINE COMPANY
CONCRETE PRODUCTS MACHINERY
Cuyahoga Falls, Ohio



Left: Roof slab being welded to truss of building. Right: Panel of tongue and groove siding being placed on new Basalt assembly plant

Introduces New Product

SHOWN HERE is erection of recently-developed roof slabs and siding as demonstrated by Basalt Rock Co., Inc., Napa, Calif., to architects, engineers, building officials, contractors and others connected with the construction industry, to officially introduce its new product, "Strecrete."

Strecrete actually is reinforced concrete, composed of machine-made concrete units, the contacting edges

of which have been precision ground. The units are secured together with prestressed steel bars positioned in recesses or grooves designed into the units. Slabs and panels of various thicknesses, from 3 to 12 in., are assembled in widths up to 8 ft. For roof construction, slabs that span 32 ft. without intermediate supports are available.

Visitors witnessed the erection of Strecrete roof panels and Strecrete tongue and groove siding, which

was attached to the steel framework of a building 40 ft. wide, 100 ft. long, and 22 ft. in height at the eaves by welding. The building now is housing equipment for the assembly of Strecrete. A. G. Streblow is president of the firm and D. O. McCall is chief engineer.

Strecrete is further described in the National Ready Mixed Concrete Association convention report which appeared in the March, 1949, issue of ROCK PRODUCTS (page 149).

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Pumps
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Screens
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Shovels, Power

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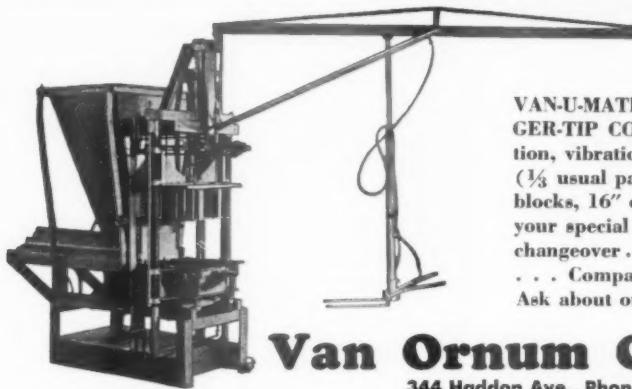
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CP-10

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\$4300.00! HOW CAN SO LITTLE MONEY BUY SO MUCH!

400 BLOCKS PER HOUR



VAN-U-MATIC BLOCKMAKER

VAN-U-MATIC has ALL the features . . . "FINGER-TIP CONTROL" pneumatic power operation, vibration and off-bearer . . . Plain pallets ($\frac{1}{2}$ usual pallet investment) . . . Makes all size blocks, 16" or 18" lengths, modular sizes or to your special core requirements . . . Quick easy changeover . . . True dimensional, perfect blocks . . . Compact . . . Easy to install and clean. Ask about our new 3 unit machine.

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**GENERAL Concrete Vibrator
BLOCK MACHINE**

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1000 BLOCKS
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SHIPPING WEIGHT 400 lbs.

The General Block Machine is amazingly practical and efficient. It is the key to highly profitable production of concrete blocks. It is rugged in construction, simple to operate and requires little power equipment at very low cost. Now in use by contractors, builders and block plants all over the world. New split type model has makes possible many more designs and sizes. Makes superior three core type blocks meeting all building code requirements. Vibrated shaft mounted in sealed ball bearings. Completely portable and can be towed. Powered by $\frac{1}{2}$ H.P. electric motor, or rigged for gasoline engine. Can produce up to 1,000 blocks per day at minimum cost. Materials for block, concrete, sand, etc., may be readily obtainable anywhere. Full operating instructions and complete mixing formulas with each machine. Immediate delivery. Get full details.

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CONCRETE PRODUCTS. October, 1949
A Section of ROCK PRODUCTS

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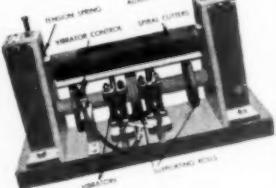
Beals

- Cleans pallets automatically
- Insures more perfect blocks
- Saves time, labor and expense
- Earns extra profits for you
- Makes better-satisfied customers

The combination of slow moving spiral cutters and rapid vibrators is highly efficient in removing accumulated concrete. Tension on spiral cutters is fully adjustable by means of set screws and heavy coil springs. For exceptionally dirty pallets, tension may be quickly and easily increased. After two weeks of running through the machine, even the dirtiest pallets become clean.

Under average operating conditions with normal usage, cutters and rolls should operate efficiently without replacement for many months. One operator reports having cleaned over 40,000 pallets without any indication of appreciable wear on cutters.

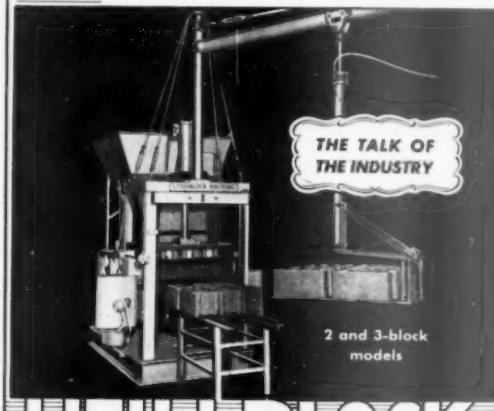
The BEALS Pallet Cleaner is shipped assembled, complete with instructions for installation. Can be installed by your own crew in about eight hours. Complete machine weighs approximately 900 pounds.



Requires no motor or additional power. Vibrators operate from air compressor on your present cement block machine.

SPRINGFIELD PALLET CLEANER
AND MANUFACTURING COMPANY
501 Southwood Drive, Springfield, Ohio

IF YOUR GOAL IS
• LOWER PRODUCTION COST
• MORE BLOCKS PER DAY
• BETTER QUALITY PRODUCT
Then here's your machine



LITH-I-BLOCK

Write

LITH-I-BAR COMPANY
Dept. 310, Holland, Mich.

Color in Concrete

The easily dispersible, non-floating, permanent, qualities of these extra strong colors produce intense shades in concrete.

Special blends in ton lots at no additional charge. Working samples furnished.

629 W. Washington Blvd.
Chicago, Illinois

1261 Broadway
New York, N. Y.

MINERAL PIGMENTS CORP., MUIRKIRK, MD.

JOIN THE

11,895 PRODUCERS

WHO REGULARLY READ

ROCK PRODUCTS

**Beautify and Protect Porous Masonry
with ONE COAT AGRASEAL**



**NEW, WATER-REPELLENT
BRUSH COAT SEALS PORES OF
CONCRETE AND BEAUTIFIES
IN ONLY ONE COAT!**

- For exterior or interior use on cinder blocks, light-weight aggregate and concrete blocks.
- Better than two or more coats of ordinary cement coatings.
- Fills all voids. No hair checking. No alligator checking. No powdering.
- No expensive equipment needed. Apply with ordinary scrub brush or short bristle paint brush.

Write for details!

TAMMS INDUSTRIES, INC.
(formerly Tamms Silica Co.)
228 N. La Salle Street, Chicago 1, Ill.

Hi- Lo'
CONCRETE TRANSPORT MIXER CO.

TRUCK MIXER

Hi- DISCHARGE PRODUCTION SPEED PROFITS!

Lo- HEIGHT COST MAINTENANCE TIME LOSS

REVOLUTIONARY TRUCK MIXER DESIGN

**CONCRETE TRANSPORT
MIXER CO.**

4987 FYLER AVE. ST. LOUIS 9, MO.

1949 Columbia Block Machine

Controlled
Vibration
with Synchronized
Pressure

Oil Hydraulic

**Three Sizes
Model 8, 4, 3**

**Automatic or
Semi-Automatic
Plain Pallets**

**All Regular and
Special Blocks**

**Makes 2-8x8x16 or
3-6x8x16 per pallet**

4 Pallets per Minute

Any Type Aggregate

Rugged Construction

Modern Design

Moderately Priced



Manufactured by

Columbia Machine Works
105 Main Street
Vancouver, Washington



with an **Erickson**
POWER LIFT TRUCK

Doubled Our Yard Capacity—"Four million blocks is a lot for one lift truck to handle in a yard that is anything but level," writes a user. "So we decided we needed another. Then this year we purchased a third Erickson, your high lift tilt style truck. In the short time that we have had it, this truck has more than paid for itself. It has about doubled the capacity of our yard and is a great help in picking up cubes as well as loading trucks."

Each Erickson Fork or Platform Truck is custom built to meet your particular needs. Write for our circular.

Erickson POWER LIFT TRUCKS, Inc.

1405 Marshall Street N. E. • Minneapolis 13, Minnesota

CLASSIFIED ADVERTISING

READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT

FOR SALE

FREE BLOCK MACHINES (GUARANTEED)

All STEARNS Machines FREE

STEARNS-Joltcretes 7's and 9's

STEARNS-Model "A" Clipper Strippers

STEARNS-Tampers with Mold Boxes

GUARANTEED FOR (1) FULL YEAR

We give STEARNS block machines FREE to anybody agreeing to buy all the pallets that come with them. The motors, mold boxes, and the attachments with surplus parts are included without extra charge.

Whatever you buy be sure that it is guaranteed for a full year and see that it is in writing.

WILLIAM M. CHASE
(Square Dealer)
15 Linwood Ave
Lincoln 0918
Buffalo 2, N. Y.

FOR SALE

Besser Vibrapac makes 3-42-6, 2-81-10, 1-12, 8" header air off bearer. 10 ft. 25 ft. mixer, with new liners, 30 ft. skip, all in good con. with many new parts, app. 1700 Steel Pallets, 70 Steel racks, air comp, water meter, automatic transporter with new battery and parts, new never used 45 ft. steel enclosed belt bucket elev. with motor, 45 v.d. 2 comp. steel bin and vol. batcher. 348 Erickson fork lift used very little. Motors, Starters, Switches all for \$20,000.00.

Besser Semi-Automatic 3½ per minute tamper with V belt drive and pallets \$6000.00

25 ft. Multiplex mixer V belt and motor like new with new liners \$1200.00.

35 ft. open steel bucket elev. with new chain \$300.00.

I.H.C. K-8 with 10 motor and 24 ft. Highway Trailer with 10,000 tires all around low mileage first class shape \$4000.00.

STRONG CONCRETE BLOCK CO.
LaCrosse, Wisconsin

UNBREAKABLE PALLET RINGS
Write for full information
TEXAS FOUNDRIES
LUFKIN, TEXAS

FOR SALE - TO SETTLE ESTATE

Well stocked Builder's Supply Business
Modern Concrete Block Plant.
Concrete Vault Plant.
Located in one of the fastest growing cities in Ohio. Only Concrete Burial Vault Factory and only Concrete Burial Vault Factory in City. Just one other Building Supply Dealer. All brand new concrete block equipment—yearly output over 300,000. This business operates the Pioneer Vault works in the State of Ohio, the founders having purchased the first Burial Vault Molds sold in the State of Ohio, and now placing around 700 vaults per year. May be purchased for Inventory Price alone. Write or inquire:

WEST BUILDER'S SUPPLY
612 W. Gambier St., Mt. Vernon, Ohio

FOR SALE

Soffett Tile Attachment (used twice) 8"x8"x24" for Besser Vibrapac \$800.00 FOB Plant

LOUISIANA CONCRETE PROD., INC.

Box 1107, Baton Rouge, La.

FOR SALE

New Cast Aluminum Pallets

Sturdy, Rigid Design
4-6-8-12 inch sizes

Special sizes or designs made to order. Liberal trade in allowance on broken or obsolete aluminum pallets may save you up to ½ the total cost.

MCDUGAL MACHINE CO.
Pump Station Road Fairmont, W. Va.

FOR SALE

1 Flam No. 3 Block machine complete with 1-4 unit 4x8x12 mould adjustable to 5" and 6" high.
1-18 unit modular brick mould
1-20' off bearer
No motor—the above equipment is new.

BOGALUSA CONCRETE PRODUCTS, INC.
P.O. 5 Bogalusa, La.

FOR SALE

2—Used Columbia Block Machines
Used Concrete Shingle Machines
Drain Tile Machines

CONCRETE MACHINE & EQUIPMENT CO.
71 S.E. Oak St. Portland, Ore.

FOR SALE

50 cu. ft. Besser Batch Mixer. Purchased new in 1946. Excellent condition. Priced low for quick sale.

CINDER PRODUCTS, INC.
Box 65, Elmwood Pl., Cincinnati 16, O.

1-F.M.C. 180 Automatic block machine in perfect condition—with 4-8 and 12" mold.

1-Kirkham Vibrator machine—with 4-6-8 and 12" mold.

1-Model 12 mixer.

1-Double hopper.

1-18 ft. skip hoist complete.

1-Barrett Craven lift truck.

80-148 block steel racks.

2200 Wood pallets for 8 in. block.

1400 Wood pallets for 12 in. block.

1 extra vibrator for each machine.

Approx. \$200.00 in spare parts.

1-80 ton Butler Bin, 2 comp. with scales—exc. cond. \$1200.00.

This is one of the best small machines made for the block industry. The quality of its design has caused us to install a Besser Machine to meet the instant demand. Price \$5500.00 F.O.B. Memphis, Tenn. or loaded on car for shipment.

BOWDEN CONCRETE PRODUCTS
2175 Person Ave. Memphis, Tenn.
Phones 48-9796 — 4-7345

FOR SALE

Complete sand and gravel and ready mixed concrete business.

1-120 ton 3 comp. bin and scales.

1-300 bbl. bulk sand and silt, scales, elev., and motor.

1-120 ft. x 2 ft. belt and 1 hp. El. Motor.

1-2000 grittacy and self feeder.

1-3 deck 4x10 screen and 7½ hp. El. motor.

2-3 yd. Jaeger mixers (New 8-48) on GMC 450 trucks (New).

1-3 yd. Studebaker Mixer on '46 Stude—tandem drive.

1-2½ yd. Jaeger mixer on '41 Ford truck. (All mixers hi-dump)

1-12' Int. dump truck.

1-Cleve dump and loader.

1-Michigan Motor Crane and Shovel (new)

1-Large shop compressor piped from shop to em.

1-Hobart welder AC & DC portable.

1-Concrete receiving hopper 4 wheel 2 bottom.

1-3000 gal. sanding tank (underground) El. pump.

1-5' ready-mixed receiver at plant (2 yrs. old).

1-40x80 warehouse and shop.

1-1937 Ford flat bed truck.

1-1937 GMC Pickup.

Only ready-mix plant in 40,000 pop. area. Sacramento River Valley.

NUNNELEY REALTY
912 - 7th St. Sacramento, Calif.

FOR SALE CONCRETE TRUCK MIXERS

3 Complete Units Concrete Truck Mixers. 2½ - 3 cu. yd. capacity. Mounted on Chevrolet Trucks and Thornton Tandems. Good mechanical condition.

HUNKINS-WILLIS LIME & CEMENT CO.
617 S. Spring Ave. St. Louis 10, Mo.
Phone Franklin 2701

PRICED TO SELL

1-Besser K3 tamper

1-4" attachment

1-6-8-10-12 inch attachment

1-Floor Tile Machine

3000 4x10 Pallets

50-148 block racks

1-Clark Platform lift truck

1-Chimney block machine with 100 pallets

1-Shovel front for Michigan Power Shovel.

NIEB CONCRETE PRODUCTS CO.
U. S. 31 and Fort St. Miles, Michigan

FOR SALE

New Monarch Silo Stave Machine
Stearns Power feeder for stave machine
Two one c. y. Jaeger mixers on Diamond T trucks.

Complete Home Insulation business, including two insulating trucks.

WATERFORD CEMENT PRODUCTS CO.
Waterford, South Dakota

FOR SALE

FOR SALE

2-Banded Cinder Crushers	each \$245.00
1-Off-beam air-hast 330.00
1-Precast set of stop forms	245.00
10-Fence Post forms 7' lengths	120.00
10-6-sided flag stone molds	50.00
1-Lintel form 3½" x 7½" x 8'	30.00
1-Pallet oller	35.00
1-Hand lift truck	27.50
50-Steel racks, knocked down	
1-Multiplex Chimney Block Machine	15.00
1-20' conveyor	55.00
1-Flower pot machine	275.00

WILLIAM M. CHASE

(Dealer)

15 Linwood Ave. Buffalo 2, N. Y.

TRUCK MIXERS

(Less Chassis)

PROMPT DELIVERY

8-JAEGER 4 YARD

Separate Engine Drive

200 gal. Water Tank

25 gal. Flush Tank

\$2,200.00 each F.O.B. Cars

Excellent Working Condition
May be inspected at:

EDWARD EHRLBAR, INC.

29 Mesarole Ave. • Brooklyn, N. Y.
Evergreen 3-5000

NEW BLADE MIXER FOR SALE

1—12 cu. ft. Darden Link Belt Mixer with clutch, drives and 10 H.P. enclosed motor (no starter) \$1,250.00 F.O.B. Plant

LOUISIANA CONCRETE PROD., INC.

Box 1107, Baton Rouge, La.

FOR SALE

Priced for immediate sale, $\frac{1}{2}$ yard In-sley Drag line with extra clam bucket; $\frac{1}{2}$ yard scree end loading tractor; 105 cu. ft. air compressor; Adams Moto grader power operated 14 ft. blade; 2 yard Dumperete.

W. H. BEHRENS COMPANY

Postville, Iowa

PACKER-HEAD WINGS

McCracken Type — PROVED to last as long or longer — yet cost considerably less. Write for prices.

TEXAS FOUNDRIES

LUFKIN, TEXAS

FOR SALE

6-inch curved mold box for Stearns Clipper Stripper. New. \$100.00 f.o.b. Frederick, Md.

RICHARD F. KLINE

14 Water St., Frederick, Md. Ph. 550

PUMICE BLOCK PLANT

One of the largest on San Francisco Peninsula. Potential possibilities \$5500 a day. Priced to sell.

LOVE REALTY CO.
630 El Camino Real, Redwood City,
California

FOR SALE

1860—3½" x 15¾" "Zonal" Used Pressed Steel Pallets. At 22c each. Will sell any amount.

ACME BLOCK AND SUPPLY CO.
1506 Mackinaw St. Saginaw, Mich.

FOR SALE

1—1946 Marion Shovel 930 2½ yd. Diesel. Excellent Condition.

1—Bituminous Concrete Batch Mix Plant. Complete with Boiler and Tanks. Capacity 100 tons per hour.

WINCHESTER CRUSHED STONE
Box 89, Winchester, Mass.

FOR SALE

Dunbruk machine with complete plant equipment for making 10,500 brick per day. Dunstone attachment. All equipment new in 1946. Now in operation.

CEMENT BRICK PRODUCTS CO., INC.
745 No. Locust St. Box 134
Ottawa, Kansas

1—No. 2 Kent continuous Mixer with Motor \$250.00
1—Belt Elevator for elevating Mix to machine
1—40' ft. Bucket Elevator
1—Multiplex chimney Block Machine—70 pallets
25—Steel Racks
All equipment in very good shape
WEST LEONARD BLOCK COMPANY
Rear 620 Leonard St., Grand Rapids, Mich.
Ph. 97757

FOR SALE

No. 7 JOLTERITE with Power Carriage and air lift for making 4", 5" and 12" x 3" core 45%. Also moulds for making 8x16x32, 10x16x32, chimney blocks, 8000 commercial steel pallets for making above sizes, 64 steel racks 42-8" capacity Kent Pallet 10100. This equipment in A-1 condition.

RALPH E. GIBSON
Carlisle, Pa. Phone — 1329-J

FOR SALE

Stearns Jolterite Block Machine with complete 5" and 4" setups, offbear, turntables, racks, pallet oller, etc. Two years old—excellent shape. Write for price list or to inspect equipment at:

MARSHALL BLOCK & SUPPLY COMPANY
P.O. Box 15 313 Chicago Drive
Grand Rapids, Mich.

FOR SALE at Sacrifice

Complete equipment for small concrete block plant, including 2 F.C. George block machines, cement mixer and conveyor belt with electric motors, and 2,000 plus pallets, all equipment ready for shipment. Can be shipped by rail for fraction of original \$5,000.00 cost. Call or write.

GREENE & AYRES
P.O. Box 591 Ocala, Florida

102 Top-3 compartment—Eric Bin and Scales—3 yard weigh hopper—2 inch Neptune Water Meter—5 foot Bucket Elevator with 10 H.P. Westinghouse motor and switches. Price \$3,500.00 cash.

MOORE-WILLS CONCRETE COMPANY, INC.
care: J. H. Napier, 1st National Bank
Bldg.
Macon, Ga.—Phone 8706

EQUIPMENT WANTED

WANTED TO BUY

One Miles No. 1 face down block machine with strike-off, holding attachment to make 8" blocks 7¾" x 15¾". Must be like new and in very good shape and reasonable in price. From Eastern States preferred. Write giving full details.

WAREHOUSE CONCRETE PRODUCTS
95 Broadway Methuen, Mass.

WANTED IMMEDIATELY

1 Used Stearns No. 7 or No. 9 Block Machine with 40 ft. 12" mold boxes, pallets, racks, 2 hand lift trucks and off bearer.
1 Suitable Skip Hoist.
1 Stearns 28 cu. ft. Mixer.
Will consider complete plant or individually.

P.O. BOX 111 Oceana, Va.

WANTED TO BUY

Besser "Victory" Vibrapac Block Machine with pallets. Must be in good condition and reasonable. Box H-96, Concrete Products, 309 W. Jackson Blvd., Chicago 6, Ill.

CEMENT COLORS

CONCRETE BRICK COLORS

CEMENT COLORS

MORTAR COLORS

made by

BLUE RIDGE TALC CO., INC.
Henry, Virginia

CEMENT COLORS—Write for samples and prices of "LANSO" CEMENT COLORS in bright shades of RED, YELLOW, GREEN, BLUE, BLACK, BROWN. Manufactured by

LANDERS-SIGAL COLOR CO.
73 Eleaven St. Brooklyn 31, N. Y.

PALLET CLEANER

HAVE YOU SEEN OUR NEW

PALLET CLEANER?

AN AUTOMATIC MACHINE FOR REMOVING CONCRETE "BUILD-UP" FROM PLAIN PALLETS. Cleans on 18" x 26" Pallet in 12 seconds.

Write for Free Literature

BERGEN MACHINE & TOOL CO., INC.
189 Franklin Ave., Nutley 10, N. J.

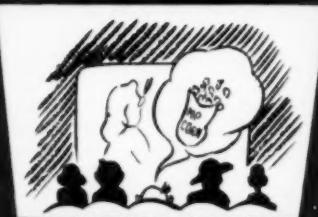
POSITIONS VACANT

SALES REPRESENTATIVE: Permanent position with opportunity for advancement for man with practical experience or knowledge of concrete design and operation of ready mix concrete plants helpful. To represent old line manufacturer of concrete hardeners, waterproofing, and technical treatments of concrete and masonry. Salary and travel expenses will be paid. Travel extensively. Write fully giving details of your experience, salary desired, snapshot, etc. to Box H-90, Concrete Products, 309 W. Jackson Blvd., Chicago 6, Ill.

WANTED: Experienced Precast Concrete Keyman and Mechanics familiar with casting, holding, and finishing jobs. Trucks and specialists in precast business. Steady work. Good pay. Give full particulars about yourself. Write—M. A. ARNOLD, P.O. Box 477, Greensboro, N. C.

USE A CLASSIFIED AD IN THESE COLUMNS FOR QUICK AND ECONOMICAL RESULTS TO BUY OR SELL — SEND COPY NOW

Missing something?



Yes . . . the popcorn. Movies call for popcorn just like masonry walls call for Blok-Mesh. Your prospect list is your customer building block list.

{ Architects } are specifying and using
{ Engineers } Blok-Mesh reinforcing
{ Contractors } for more durable
{ Home Owners } masonry walls

BLOK-MESH

BLOCK PLANT OPERATORS...

ARE YOU MISSING SALES?

Not if you're a Blok-Mesh dealer, because building blocks and Blok-Mesh just naturally go together for greater sales volume.

The advantages of Blok-Mesh are important in all types of masonry including concrete block, thin brick, block, clay tile and brick, and as a device to tie face brick to back up block, and for cavity wall construction. Due to its low cost, its ease of handling, and greater strength imparted to a wall, architects like to specify its use when plans are drawn. Moreover, it affords against unsightly cracks that occur frequently in ordinary masonry walls. In many cases this means a pre-sold item to a prospective list you already have established — your building block customers. It's a natural for the block plant operator who is also a Blok-Mesh dealer.

Write
for detailed
descriptive Blok-
Mesh folder and Dealer
price list . . . address
Dept. B-D 2440 Pennsylvania,
Kansas City 8, Missouri!

BLOK-MESH . . .

. . . designed to eliminate "stair-step" cracking above lintels and beneath sills—greater lateral strength is gained at small cost.

. . . comes in 10' lengths and is packaged in bundles of 50 pieces (500 linear ft.)

. . . is available in either plain or galvanized wire.

. . . is manufactured of high tensile wire rods—electrically welded every 18 inches.

. . . is made up for wall thicknesses of 4", 6", 8", 10", 12", and 13". Walls of greater thicknesses may be accommodated by using a combination of these sizes.

. . . is available in three types—standard, flat, or extra heavy.

CONSTRUCTION THE MATERIALS

CARTER-WATERS

KANSAS CITY CORP. 8. MISSOURI

BLOK-MESH BOLSTERS OVERALL SALES . . . A BOOST TOWARD BETTER BUSINESS FOR BLOCK PLANT OPERATORS.

INDEX TO ADVERTISERS IN THE CONCRETE PRODUCTS SECTION OF ROCK PRODUCTS

ALSO SEE INDEX OF ROCK PRODUCTS SECTION
ADVERTISERS ON PAGES 184, 185

Acme Block and Supply Co.	167
Arnold, M. A.	167
Automatic Spring Coiling Co.	164
Behrens, W. H., Co.	167
Bergen Machine and Tool Co., Inc.	167
Blue Ridge Talc Co., Inc.	167
Bogalusa Concrete Products, Inc.	166
Bowden Concrete Products	166
Carter-Waters Corporation	168
Cement Brick Products Co., Inc.	167
Chase, Wm. M.	166, 167
Cinder Products, Inc.	166
Clipper Manufacturing Co.	160
Columbia Machine Works	165
Concrete Machine and Equipment Co.	166
Concrete Transport Mixer Co.	165
Ehrbar, Edward, Inc.	167
Erickson Power Lift Trucks, Inc.	165
General Engines Co.	163
Gibson, Ralph E.	167
Greene and Ayres	167
Hardcrete Block and Supply Co.	167
Hunkins-Willis Lime and Cement Co.	166
Jackson & Church Co.	170
Jaeger Machine Co.	159
Kent Machine Company	161
Kline, Richard F.	167
Landers Segal Color Co.	167
Lith-I-Bar Company	164
One Star Cement Corporation	146
Louisiana Concrete Products, Inc.	166, 167
Love Realty Co.	167
McDougal Machine Co.	166
Martin Iron Works	163
Mineral Pigments Corp.	164
Moore-Wills Concrete Co., Inc.	167
Nieb Concrete Products Co.	166
Nunneley Realty	166
Springfield Pallet Cleaner & Mfg. Co.	164
Strong Concrete Block Co.	166
Tamms Industries, Inc.	165
Texas Foundries	166, 167
Truck Mixer Manufacturers Bureau	144
Universal Concrete Mch. Co.	160
Van Ornum Co.	163
Wareille Concrete Products	167
Watertown Cement Products Co.	166
West Builder's Supply	166
West Leonard Block Co.	167
Williams, C. K., & Co.	158
Winchester Crushed Stone	167
Worthington Pump & Mch. Corp.	169



**REPORT FROM OREGON:
"SPLENDID PERFORMANCE"**

Blue Brute team-mates — three of a battery of WJ-45 Rock Drills, powered by Portable Air Compressors — used by the Del R. Beebe Construction Co. of Eugene, Oregon, excavating for a big housing project's sewerage system. The Beebe Co. reports "splendid performance" in every detail of Blue Brute operation.

Oregon and Ohio Agree: BLUE BRUTE AIR TOOLS ARE TOP COST-CUTTERS!

REPORT FROM OHIO: "VERY MUCH PLEASED"

A Blue Brute construction team in Toledo, Ohio, removing street paving. Owner John V. Rush of Toledo says: "Our WB-85 Paving Breakers and 60' Portable Compressors make ideal combinations. In four months' continuous operation, removing and replacing 6" and 8" concrete base, we have had absolutely no maintenance trouble on this equipment. We are very much pleased with it."

Put Blue Brute teams to work for you — and count on big savings from then on! Starting with Blue Brute Portable Compressors — 60' to 500' — you've got the most dependable and economical air suppliers ever made . . . tireless, trouble-free performers, with the easy-breathing Feather® Valves that get *all* the air out of every drop of fuel.

Then hook up their famous Blue Brute team-mates — Hand-Held Rock Drills, Clay and Trench Diggers, Tampers, Sheeting Drivers, Wagon Drills — and you're making air go farther and do more than it ever did.

*Reg. U.S. Pat. Off.

before. That's because these Worthington air tools not only hit harder and last longer — they have the lightness, compactness and *precision balance* that means easier handling . . . faster, smoother progress . . . hours and dollars saved on every job.

Learn how Blue Brute teamwork can save you time and money. See your



nearby Blue Brute Distributor for more reasons why *there's more worth in a Blue Brute*, or write us direct.

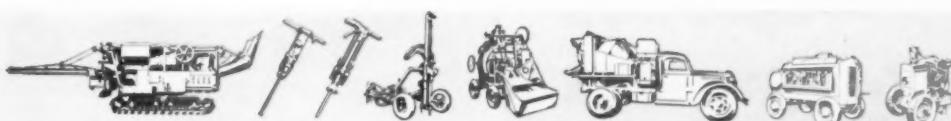
H-11

WORTHINGTON



WORTHINGTON PUMP AND MACHINERY CORPORATION
Construction Equipment Department, Harrison, New Jersey
Distributors in all principal cities

Buy BLUE BRUTES



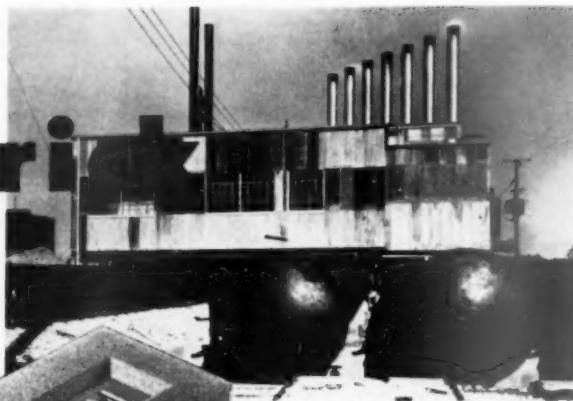
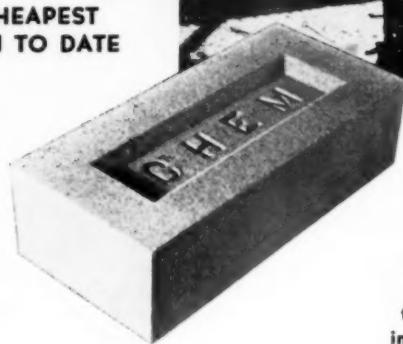
IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

AT LAST!

chem bright

A FACE BRICK OF HIGHEST QUALITY— MADE WITH THE CHEAPEST MATERIALS KNOWN TO DATE

"CHEM BRICK" requires no cement or commercial lime . . . is made only with sand and waste materials.



**Detroit Brick & Block Company, first licensee by Jackson & Church Company to manufacture
KNCHEM BRICKS**

"CHEM BRICK" . . .

the sensational, new building material . . . passes the A.S.T.M. specifications for first quality face brick and the most exacting freezing and thawing tests . . . yet no ingredient costs more than \$2 per ton, including binder.

A REAL HIGH QUALITY FACE BRICK WHICH CAN BE MADE CHEAPER THAN ANY COMMON BRICK ON THE MARKET TODAY

This quality product . . . made by the cheapest process in the brick industry is finding a ready market in the Detroit area where it has brought usually expensive brick veneering within the reach of average purses. In addition to its low cost other features are its distinctive finish, color and uniformity which give any building that "quality appearance" when used as a facing material.

Besides being a fine face brick . . . "CHEM BRICK" is an all-purpose brick because of its low cost of manufacturing. Can be used anywhere brick is used . . . facing, back-ups, partitions, manholes, fire places, chimneys, basement walls, etc.

Boxed at left are excerpts from test reports on "CHEM BRICK" made by Pittsburgh Testing Laboratory. Note distinctive appearance of home pictured utilizing "CHEM BRICK" as facing material.

PITTSBURGH TESTING LABORATORY
DETROIT DISTRICT
PITTSBURGH, PA.

April 13, 1948

REPORT
TESTS OF CEMENT BRICK
MANUFACTURED BY
DETROIT BRICK & BLOCK CO.

COMPRESSIVE
(# Brick Crashed Flat-wise)

NO. OF SAMPLES	100	LB. PER SQ. INCH
	5	Average 4910

MODULUS OF ELASTICITY

NO. OF SAMPLES	200	LB. INCHES SQ. INCH
	5	Average 955

ABRASION
(24 Hour Test - 1000 G. Weight - 5' Height)

NO. OF SAMPLES	100	PERCENT ABSORPTION
	5	Average 11.6

All samples submitted by Detroit Brick & Block Co.

PITTSBURGH TESTING LABORATORY
O.W. Anderson
MANAGER DETROIT DISTRICT

April 8, 1948

REPORT - FREEZING & THAWING

METHOD OF TEST - A.I.T.M. Designation: 67-W44 covering Standard Methods of Freezing & Thawing Bricks for a total of 50 cycles.

TEST MATERIAL - Test indicated compliance with specification requirements for freezing and thawing test.

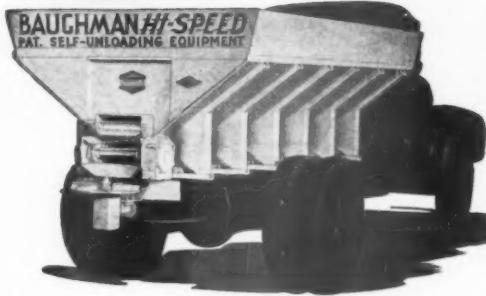
Respectfully submitted,
PITTSBURGH TESTING LABORATORY
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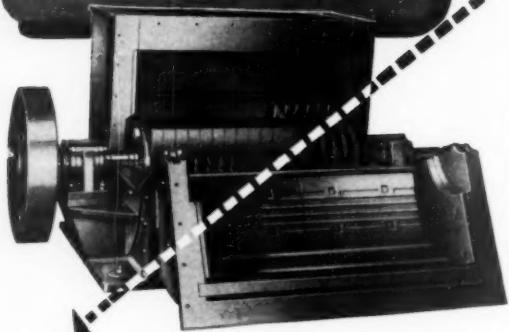
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YARDS PER HR.	3	6	12	20	30	35	50	75

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W. A. RIDDELL CORP.
Bucyrus, Ohio

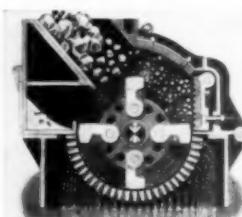
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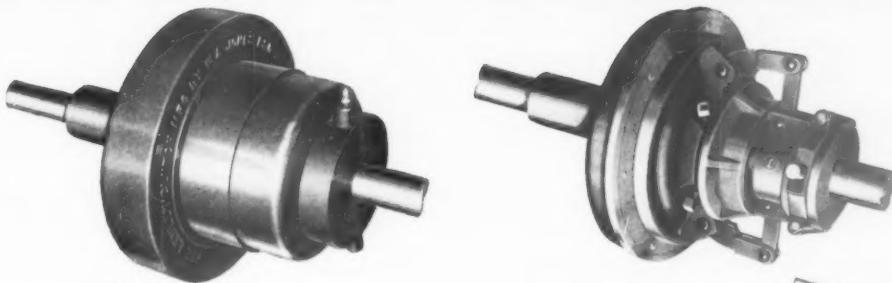
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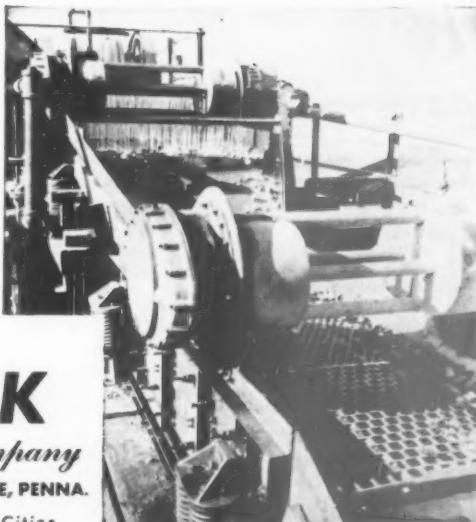
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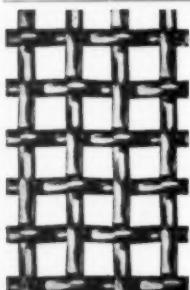


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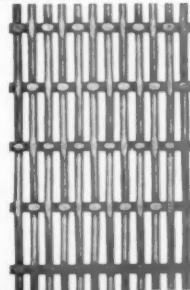


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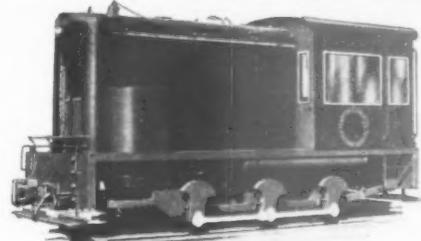
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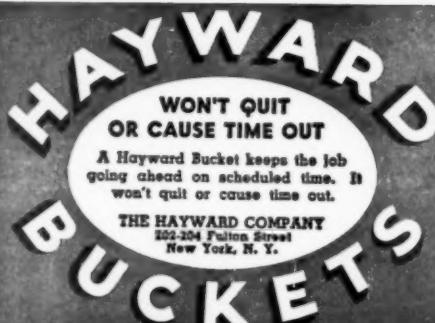


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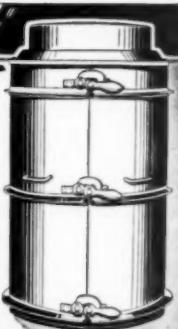
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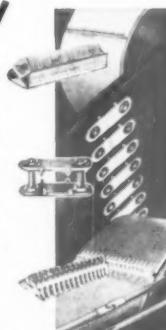
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1—No. 352 Raymond Coal Pulverizers.

OLIVER VACUUM FILTERS:

1—1/2' ALL STAINLESS STEEL, top feed type, UN-USED.

1—8'x12' acid proof, wood lead and rubber fitted.
2—8'x10' all steel, used six months.
3—8'x10', enclosed steel drums, wood staves.
2—11'x12'x10', all steel.
2—12'x12'x10', wood staves.

JAW CRUSHERS:

60"x42" Farrell, 24x36" Farrell, 22x50" all steel frame Champion, 25x40" and 20x36" Cedar Rapids, single shaft, roller bearing, 20x36" Pioneer, 18x36" Farrell, 16x36" Tyler, 18x36" Good Roads.

GYRATORY CRUSHERS:

30" Superior McCully, No. 20A Telmuth.

20" Superior McCully, No. 9B Gates; No. 16H, 13B and 10H Telmuth.

1—No. 322B Allis-Chalmers; 2—Traylor Type TY 1'8" and 2'6", also 3' TZ; 1—30" Telmuth Gyrasphere.

1—No. 848B Allis-Chalmers, Unused, with 100 H.P. motor.

1—18" Telmuth Intercone.

1—3" Symons Cone with coarse and fine bowls.

1—3" Symons Cone with fine bowl.

1—24" Symons Cone, standard, with fine bowl and 150 H.P. motor.

2— $\frac{5}{8}$ ' Symons Cone, short head type, each with 150 H.P. motor.

6—Kennedy, No. 19, 21S, 37S.

1—No. 40B Telmuth, 7' feed, 1- $\frac{1}{2}$ " discharge.

VIBRATING SCREENS:

10—Tyler Hammer Battery 3'x5' No. 33, single deck; 4'x5' No. 37 single deck; battery 4x5' No. 51, double deck; 4x10' No. 38 single deck; 3x10' No. 58, single and double deck.

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1—Bay City, 1/2 yard, Model K-2, good condition.

1—General 1/2 yard shovel, good condition \$3,500.00

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Available in 200, 3 months, now operating 2—2-cylinder DeLaVergne VG Engines 277 r.p.m.—130 H.P. each.

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Air Compressors	Equipment	Electric Motors	Pulverizers	Trucks, Industrial
Air Separators	Concentrating Tables	Engineering Service,	Scalers	Trucks, Other Body
Agricultural Mixing Plants	Concrete Mixers	Consulting and Designing	Screen Cloth	Truck Motor
Bagging Machines	Concrete Mixing	Explosives & Dynamite	Screws	Vibrators
Bags	Plants	Fans and Blowers	Scrubbers: Crushed	Welding & Cutting
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Block Machines	Sand			
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DUCTS ARE NEW, GUAR-
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ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"
42"	5	1/8"	1/16"
36"	6	1/8"	1/16"
30"	6	1/8"	1/16"
30"	5	1/8"	1/16"
26"	5	1/8"	1/32"
24"	5	1/8"	1/32"

Width	Ply	Top-Bottom	Covers
24"	4	1/8"	1/32"
20"	5	1/8"	1/32"
20"	4	1/8"	1/32"
18"	4	1/8"	1/32"
16"	4	1/8"	1/32"
14"	4	1/16"	1/32"
12"	4	1/16"	1/32"

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ENDLESS "V"

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply
In. 18"	6	10"	6
quire 16"	6	10"	5
For Pric- 14"	6	8"	6
es — Men- 12"	6	8"	5
nition Size and 12"	5	6"	4
Lengths. 12"	5	6"	4

HEAVY DUTY RUBBER HOSE

FIRE HOSE

APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED

I.D. Size	Length	Per Length
2½"	50 feet	\$28.00
"	25 "	16.00
2"	50 "	23.00
"	25 "	13.00
1½"	50 "	20.00
"	25 "	11.00

Specify Thread On Couplings

I.D. Size	Length	per Length
¾"	25 feet	\$4.25
"	50 "	8.00
1"	25 "	6.25
"	50 "	12.50
1¼"	25 "	7.50

Each Length with Couplings Attached

AIR HOSE

I.D. Size	Length	per Universal Length	Couplings
½"	25 feet	\$5.00	\$1.50 Pair
"	50 "	10.00	1.50 Pair
¾"	25 "	7.50	1.50 Pair
"	50 "	15.00	1.50 Pair
1"	25 "	10.00	1.50 Pair
"	50 "	20.00	1.50 Pair

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1½"	25 "	10.00
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"	50 "	20.00

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K-55 Link Belt Electric Shovel,
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5' Dia. x 8' Air Swept Tube
Mill, Complete with Motors,
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1—REX PUMPCRETE, Model 160 Double, Completely Overhauled. Gasoline Engine Driven, Latest Model Machine with Selective Drive Transmission, with approximately 1,000 H.P. ft. 7" Pipe.
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1—Barge (steel) 28x95
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1—Diesel Engine Sea Mule Tug Boat
1—Dredge Barge 30x95 completely rebuilt June 1949 with 8" Pump and 4x12 4-deck Screening Plant.

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225 HP Busch Sulzer 150 KW diesel engine generator set.
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3306", 3308", 3310", 3312", 3314", 3316", 3318", 3320", 3322", 3324", 3326", 3328", 3330", 3332", 3334", 3336", 3338", 3340", 3342", 3344", 3346", 3348", 3350", 3352", 3354", 3356", 3358", 3360", 3362", 3364", 3366", 3368", 3370", 3372", 3374", 3376", 3378", 3380", 3382", 3384", 3386", 3388", 3390", 3392", 3394", 3396", 3398", 3400", 3402", 3404", 3406", 3408", 3410", 3412", 3414", 3416", 3418", 3420", 3422", 3424", 3426", 3428", 3430", 3432", 3434", 3436", 3438", 3440", 3442", 3444", 3446", 3448", 3450", 3452", 3454", 3456", 3458", 3460", 3462", 3464", 3466", 3468", 3470", 3472", 3474", 3476", 3478", 3480", 3482", 3484", 3486", 3488", 3490", 3492", 3494", 3496", 3498", 3500", 3502", 3504", 3506", 3508", 3510", 3512", 3514", 3516", 3518", 3520", 3522", 3524", 3526", 3528", 3530", 3532", 3534", 3536", 3538", 3540", 3542", 3544", 3546", 3548", 3550", 3552", 3554

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230'-24' belt conveyor, Timken bearings
230'-24' belt conveyor, Timken bearings
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Belt trimmers for 20" and 24" belt
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New Standard Wood Apron Conveyor, 48"x105'
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Type C, D 35, RPM 1350, Amperes 10.2, Serial
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and switches, serial No. 3100. Type S.W.M. Date 9-44.
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1—Model J-30 Ingersoll-Rand Jack hammer.
1—Model N-72 Ingersoll-Rand Jack hammer.
1—Model X-59 Ingersoll Rand Jack hammer.
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WANTED—Used one yard crane or shovel.

WANTED—One 55 foot crane boom for a one yard Osgood Competitor, serial No. 2282.

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Marshallville, O. Barberon, O.

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Ajax Flexible Coupling Co., Inc.	174	Jeffrey Mfg. Co.	142
Allis-Chalmers	12, 18, 29, 39, 117	Jones, W. A., Fdry. & Mach. Co.	173
American Brake Shoe Co.		Kansas City Hay Press Co.	142
American Manganese Steel Div.	46, 136	Kennedy-Van Saun Mfg. & Engineering Corp.	25
Electro-Alloys Division	54	Kent Machine Company	161
American Pulverizer Co.	135	Kirk & Blum Mfg. Co.	140
Armstrong-Bray & Co.	176	Koppers Co., Inc.	26
Austin-Western Co.	68	Kraft Bag Corp.	142
Automatic Spring Coiling Co.	164	Leschen, A., & Sons Rope Co.	138
Bahecock & Wilcox Co.	42	Lith-I-Bar Company	164
Baughman Mfg. Co., Inc.	121, 171	Lone Star Cement Corporation	146
Bemis Bros. Bag Co.	48	Mack Trucks, Inc. Inside Front Cover	
Berg Vault Co.	176	Marion Power Shovel Co.	45
Blaw-Knox Co.	175	Martin Iron Works	163
Bonded Scale & Machine Co.	136	Merrick Scale Mfg. Co.	139
Bradley Pulverizer Co.	130	Mine & Smelter Supply Co.	138
Bucyrus-Erie Co.	186	Mineral Pigments Corp.	164
Buell Engineering Co.	63	Murphy Diesel Co.	72
Calumet Steel Castings Corp.	175	National Airoil Burner Co., Inc.	139
Cape Ann Anchor & Forge Co.	184	Naylor Pipe Co.	120
Carter-Waters Corp.	168	Neft & Fry Co.	136
Caterpillar Tractor Co.	35	New Haven Vibrator Co.	172
Chain Belt Company	32	New Holland Manufacturing Co.	
Chase Bag Co.	44	Inside Back Cover	
Chicago Perforating Co.	176	Nordberg Mfg. Co.	22
Chicago Pneumatic Tool Co.	28	Northwest Engineering Co.	5
Chicago Steel Foundry Co.	134	Osgood Co.	130
Cleveland Wire Cloth & Mfg. Co.	135	Owen Bucket Co.	174
Clipper Manufacturing Co.	160	Pennsylvania Crusher Company	66
Colorado Fuel and Iron Corp.	33	Quinn Wire & Iron Works	176
Columbia Machine Works	165	Raymond Pulverizer Division	16, 17
Combustion Engineering—Super- heater, Inc.	16, 17	Resisto-Loy Co.	185
Concrete Transport Mixer Co.	165	Richardson Scale Co.	139
Continental Gin Company	52	Riddell, W. A., Corp.	171
Davenport Besler Corp. Works	175	Rogers Iron Works Co.	133
Deister Machine Co.	122	Ryerson, J. T., & Son, Inc.	61
Dempster Brothers, Inc.	62	St. Regis Sales Corp.	43
Detroit Diesel Engine Div.	115	Sauerman Bros., Inc.	137
Dixie Machinery Mfg. Co.	40	Screen Equipment Co., Inc.	129
Dodge Division	47	Sintering Machinery Corp.	133
Du Pont, E. I., de Nemours, & Co., Inc.	124	Sly, W. W., Mfg. Co.	113
Eagle Crusher Co.	137	Smith, F. L., & Co.	58
Eagle Iron Works	131	Smith Engineering Works	30, 31
Easton Car & Construction Co.	3	Springfield Pallet Cleaner & Mfg. Co.	164
Ehram, J. B., & Sons Mfg. Co.	142	Stephens-Adamson Mfg. Co.	64
Electric Steel Foundry	127	Stroh Process Steel Co.	50
Ensign-Bickford Co.	37	Sturtevant Mill Co.	55
Erickson Power Lift Trucks, Inc.	165	Sun Oil Company	41
Erie Steel Construction Co.	27	Syntron Co.	132
Euclid Road Machinery Co.	65	Tamm Industries, Inc.	165
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Fuller Company	34	Timken Roller Bearing Co.	4
Gardner-Denver Co.	13	Traylor Engineering & Mfg. Co.	6
Gates Rubber Co.	24	Truck Mixer Manufacturers Bureau	144
General Electric Co.	8, 9, 21	Twin City Iron & Wire Co.	176
General Engines Co.	163	Tyler, W. S., Co.	174
General Excavator Co.	130	Union Bag & Paper Corp.	23
General Motors Corp.	115	Union Wire Rope Corp.	10, 11
Gilson Screen Company	138	U. S. Electrical Motors, Inc.	176
Goodrich, B. F., Co.	1	Universal Concrete Machinery Co.	160
Goodyear Tire & Rubber Co.		Universal Engineering Corp.	36
Gruendler Crusher & Pulverizer Co.	140	Universal Road Machinery Co.	174
Hammond Bag & Paper Co.	141	Universal Vibrating Screen Co.	132
Hardinge Company, Inc.	128	Van Ornum Co.	163
Harnischfeger, P. & H., Corp.	19	Vulcan Iron Works	138
Hayward Company	176	Western Machinery Co.	119
Heil Company	141	Western Precipitation Corp.	20
Hendrick Mfg. Co.	173	Wickwire Spencer Steel Division	33
Highway Equipment Co., Inc.	172	Wilfley, A. R., & Sons, Inc.	176
International Harvester Co.	51	Williams, C. K., & Co.	158
International Paper Co.	53	Williams Patent Crusher & Pulverizer Co.	172
Iowa Mfg. Co.	14, 15	Worthington Pump & Mchly. Corp.	169
Jackson & Church Company	170	Yuba Mfg. Co.	123

INDEX TO CLASSIFIED ADVERTISERS

Business Opportunities	183
Cement Colors	167
Consulting Engineers	183
Core Drilling	183
Equipment Wanted	167, 183
For Sale	166, 167, 177—183
Pallet Cleaner	167
Positions Vacant	167, 183
Positions Wanted	183

**ALSO SEE INDEX OF CONCRETE PRODUCTS SECTION ADVERTISERS
ON PAGE 168**

Advance Industrial Supply Co.	179
Albert Pipe Supply Co., Inc.	181
Bacon-Pietsch Co., Inc.	181
Barton Mines Corp.	179
Blue Ball Machine Works	181
Bonded Scale and Machine Co.	181
Brown-Bevis Equipment Co.	181
Bryan, H. H.	183
Carlyle Rubber Co., Inc.	180
Citizens Homes Company	178
Consolidated Products Co., Inc.	179
Consolidated Rock Products	181
Corson, G. & W. H., Inc.	179
Crume Brick Company	178
De Yorgi Brothers, Inc.	183
Dominion Minerals, Inc.	180
Eastern Clay Products, Inc.	179
Eastern Rock Products, Inc.	180
Finn, N. A., Company	182
Foster, L. B., Co.	182
Frank, M. K.	182
Furnival Machinery Co.	177, 180, 181, 182, 183
General Concrete Products Corp.	182
General Traders	178
Goodwin, C. B.	180
Gray's Concrete Products	183
Guion, H. P.	181
Heat and Power Co., Inc.	177
Hedrick, B. V., Gravel and Sand Co.	183
Heidenreich, E. Lee, Jr.	183
Independent Stave Co.	182
Johnson and Hoehler, Inc.	178
Lauer, H. H.	183
Lawrence, Ollie E.	182
Long, G. E.	177
McLeod, Alex T.	181
Mid-Continent Equipment Co., Inc.	177
Midwest Steel Corp.	181
Mississippi Valley Equipment Co.	180
Modesitt, Wm.	179
Morse Bros. Machy. Co.	182
New York Trap Rock Corp.	182
Nussbaum, V. M., & Co.	181
Ohio Asphaltic Limestone Co.	180
O'Neill, A. J.	177
Palmer Crushing Co.	182
Pan-American Engineering Co.	177
Pennsylvania Drilling Co.	183
Rupp Construction Co.	183
Smith, H. Y., Co.	177
Smithtown Concrete Materials Corp.	183
Sorrels Supply Co.	178, 179
Southern Sand and Gravel Co.	183
Stevenson, James	177, 179, 182
Thiebaud, Henry, Sand & Gravel	178
Tractor and Equipment Co.	178
Tyler Equipment Corp.	178
Ulrich and Ringre	181
Unverzagt, G. A., and Sons, Inc.	182
Walsh, Richard P., Co.	178
Waukesha Lime and Stone Co., Inc.	178, 182
Weiss, B. M., Company	180
Wilmarth Oil Co.	180

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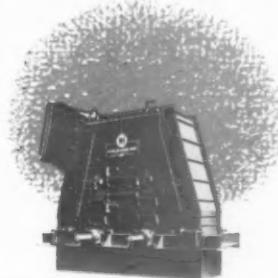
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